

OPERATOR'S MANUAL

9518 SERIES COMPACT DIESEL TRACTOR



FORM - 1671525
PRINTED IN U.S.A.
829



TO OUR DEALER**DEALER'S PREDELIVERY SERVICE GUIDE FOR 15 PTO HP TRACTOR**

DETAILS OF ITEMS LISTED BELOW ARE COVERED IN THIS OPERATOR'S MANUAL OR IN THE SERVICE MANUAL

SHIPPING DAMAGE

- Tractor has been checked for shipping damage.

TRACTOR SET-UP

- This tractor has been completely set-up in accord with the Tractor Set-Up Instruction supplied with the tractor.

PRE-OPERATIONAL CHECK, do before engine is started.

- COOLANT LEVEL is between FULL & ADD MARK on over flow bottle.
- ENGINE OIL LEVEL is between "FULL" and "ADD" marks on dipstick.
- TRANSMISSION - HYDRAULIC System OIL LEVEL is up to level mark.
- AIR CLEANER ELEMENT is clean and properly installed.
- FWD axle oil level (if unit so equipped)
- All air intake hoses and clamps are properly installed and tightened.
- A sufficient quantity of No. 2 diesel fuel for all normal predelivery operation has been placed in the fuel tank.
- All Safety and Operational Decals & SMV Emblem are properly installed and fully legible.
- Check oil level in injector pump.

OPERATION AND ADJUSTMENT

- Tire pressures are set within the pressures listed in the Tires Pressure and Load Tables for the size tires on this tractor.
- Fan belt is properly tightened.
- Battery electrolyte is at the indicator level and the specific gravity is 1.240 or above in each cell.
- Instruments and warning lights operate correctly.
- Wheel guard lights are properly connected to the tractor wiring harness and all lights operate correctly in the various light switch positions.
- The safety start switches on clutch pedal & PTO shift lever do not allow engine to start unless they are both in disengaged position.
- The brakes function properly and are adjusted correctly.
- The clutch functions properly and is adjusted correctly.
- The engine Glow Plugs operate and the engine starts correctly.
- Throttle and fuel shut off linkage operate correctly.
- Engine low idle speed is 700 to 800 RPM, and high idle speed is 2750 to 2850 RPM after engine is warmed up to operating temperature.
- Hydraulic relief pressure is approx. 1900 PSI (13100 kPa) at 2500 engine RPM.
- All hydraulic functions operate correctly.
- Transmission gear shift and range shift levers operate smoothly in all gears.
- Tractor operates properly in all gears.
- After tractor has been operated and thoroughly warmed up there are no leaks of:
 - a. engine oil.
 - b. power train and hydraulic oil.
 - c. radiator coolant.
- Coolant anti-freeze tests to -20° F (-29° C) or lower.
- All grease fittings on the tractor have been lubricated.
- Overall appearance of tractor is clean and new.
- Operator's manual is with the tractor

TO OUR DEALER

TO OUR DEALER

DEALER'S PREDELIVERY SERVICE GUIDE FOR 15 PTO HP TRACTOR

EXPLAIN TO YOUR CUSTOMER THE CARE, SAFE OPERATION AND ADJUSTMENT OF ITEMS LISTED BELOW:

- | | |
|---|---|
| <input type="checkbox"/> LUBRICATION | <input type="checkbox"/> DRAWBAR & 3-POINT HITCH |
| <input type="checkbox"/> BREAK-IN PERIOD | <input type="checkbox"/> TRANSMISSION |
| <input type="checkbox"/> FRONT WHEEL BEARINGS | <input type="checkbox"/> BATTERY CARE |
| <input type="checkbox"/> FWD OPERATION | <input type="checkbox"/> POWER TAKE-OFF |
| <input type="checkbox"/> ENGINE COOLANT TEMPERATURE | <input type="checkbox"/> BRAKES |
| <input type="checkbox"/> RADIATOR & ENGINE DRAIN PLUG | <input type="checkbox"/> AIR CLEANER |
| <input type="checkbox"/> RADIATOR PRESSURE CAP | <input type="checkbox"/> LIGHTS |
| <input type="checkbox"/> FAN BELT ADJUSTMENT | <input type="checkbox"/> TIRE PRESSURE |
| <input type="checkbox"/> ENGINE OIL | <input type="checkbox"/> WHEEL TREAD |
| <input type="checkbox"/> PROPER FUEL | <input type="checkbox"/> STARTING & STOPPING (Tractor & Engine) |
| <input type="checkbox"/> OIL FILTER | <input type="checkbox"/> ACCESSORIES |
| <input type="checkbox"/> FUEL FILTER | <input type="checkbox"/> STORING TRACTOR |
| <input type="checkbox"/> OPERATOR'S CONTROLS & INSTRUMENT PANEL | <input type="checkbox"/> USER'S RESPONSIBILITY & WARRANTY |
| <input type="checkbox"/> GEAR SHIFT | <input type="checkbox"/> OPERATOR'S MANUAL DELIVERED TO OWNER & HE HAS BEEN INSTRUCTED AS TO ITS CONTENTS |
| <input type="checkbox"/> ENGINE CLUTCH | <input type="checkbox"/> AGREE ON STARTING DATE IN FIELD & 100-HR. CHECK |
| <input type="checkbox"/> TOWING | <input type="checkbox"/> OPERATOR'S SAFETY PRECAUTIONS, SHIELDS & DECALS |
| <input type="checkbox"/> SAFETY START SWITCHES | |
| <input type="checkbox"/> HYDRAULIC SYSTEM | |

TO OUR CUSTOMER

- The following pages and illustrations are printed to help supply you with the knowledge to better operate and service your new equipment.

We are proud to have you as a customer and feel you will be proud to be an owner of this equipment..

Any piece of equipment needs, and must have a certain amount of service and maintenance to keep it in top running condition. We have attempted to cover all the adjustments required to fit most conditions; however, there may be times when special care must be taken to fit a condition.

Study this operator's manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate your new equipment. Remember, it is a machine and has been designed and tested to do an efficient job in most operating conditions and will perform in relation to the service it receives.

If special attention is required for some conditions, ask your authorized Dealer; his Parts and Service Organization will be glad to help and answer any questions on operation and service of your new machine.



This symbol is used to call your attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol - Heed Its Warning.

USER'S RESPONSIBILITY

It is the responsibility of the user to read the Operator's Manual and understand the safe and correct operating procedures as pertains to the operation of the product, and to lubricate and maintain the product according to the maintenance schedule in the Operator's Manual.

The user is responsible for inspecting his machine and for having parts repaired or replaced when continued use of the product would cause damage or excessive wear to other parts. It is the user's responsibility to deliver his machine to an authorized dealer, for service or replacement of defective parts which are covered by the standard warranty. When requesting warranty service, you must present your copy of delivery record.

The user should notify his Selling Dealer in advance so arrangements can be made to have his 100-hour or 30-day inspection performed. The user should not be charged for this inspection or adjustment, but is expected to pay for oil, filters, or any parts and labor which are not covered by the standard warranty. The user is responsible for bringing the product to the Selling Dealer's shop to have this inspection performed.

If the Dealer is requested by the Customer to travel to another location, or haul the machine to his shop for the purpose of performing a warranty obligation or free inspection, it would be for the Customer's convenience, and the cost for such trips is to be paid for by the Customer. Any arrangement whereby the Dealer agrees to absorb all or a part of the cost of these trips is to be made between the Dealer and the Customer and is to be considered a courtesy to the Customer.

The user will advise the dealer when unit will start in field so dealer representative can be on hand to make necessary adjustments and help you get started properly.

We do not allow credit for the cost of travel time, mileage, or hauling as a warranty allowance.

WARRANTY Your warranty for new equipment will be received from your authorized dealer. You will be required to pay any premium for overtime labor requested by you, any charge for making service calls and for transporting the equipment to and from the place where warranty work is performed. Normal maintenance service and repair work not covered by the warranty during the warranty period and all service after the warranty period will be charged for at the dealer's regular rates and prices.

7/79-6

THE NEW EQUIPMENT BATTERY SERVICE ADJUSTMENT POLICY

1. If within a period of 90 DAYS after day of sale to the original user, the new equipment battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, the company will replace it with an equivalent new battery, without charge, to the original user.
2. If after the expiration of such 90 DAYS but before the expiration of 24 months from date of sale to the original user (each such month being designated herein as a unit of service) the new equipment battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, it will be replaced for the original user, in exchange for the unserviceable battery, with an equivalent new battery at an adjusted price. This adjusted price shall be determined by applying to the then current retail price of the new battery, the percentage of the maximum (24) units of service which was received from the unserviceable battery.

LIMITATIONS

No-charge replacements or adjustments under this policy may be made by any authorized dealer.

This policy does not cover the following:

1. Unserviceability due to abuse or neglect, failure to maintain recommended electrolyte level, fire wreckage, explosion, freezing, the addition to the battery of any chemical or solution other than approved water or battery grade sulfuric acid of proper gravity, the use of a group size smaller than the group size of the original equipment battery, or continued operation of the battery in an undercharged condition (below half charge - 1.190 sp. gr.).
2. Breakage of containers, covers or posts.
3. The cost of transportation, service calls, recharges or the use of rental batteries.

Proof of date of purchase is required for all claims. This policy is void if the date coding on the battery is removed or destroyed.

AE 5-73

CONTENTS

TO OUR DEALER	1
TO OUR CUSTOMER	2
USER'S RESPONSIBILITY	3
BATTERY SERVICE ADJUSTMENT POLICY	3
SAFETY	5 thru 10
SPECIFICATIONS	11
GENERAL INFORMATION	12, 13
LUBRICATION AND SERVICE	
Time Interval Chart for Service Items	16
Lubrication and Service Guide	17
Front Axle	18
3-Point Hitch	18
Clutch - Brake Shaft Assembly	18
Engine Cooling System	19
Engine Oil Levels & Filters	20
Engine Fuel Sediment Bowl & Filter	20
Bleed Air from the Fuel System	21
Front Wheel Bearings	21
Transmission & Hydraulic System Oil	
Level & Filter	22
Front Axle Drive	23
Battery	23
Fuel Tank	24
Air Cleaner	24
Air Cleaner Element	25
Alternator	26
Injection Pump Lubrication	26
Engine Service Tips	27
Storage of Tractor	27

CONTENTS

OPERATING CONTROLS AND INSTRUMENTS	
Instruments & Controls	30 thru 34
OPERATION	
Starting & Stopping the Engine	36
Fast Warm-up Period	36
Brake-in Period	36
Engine Clutch Pedal	37
Gear Shifting - Transmission	37
Coasting	37
Brakes	38
PTO Shaft	38
PTO Operating Instructions	39
3-Point Hitch	40, 41
Tire Inflation	42
Weighting the Tractor	43
ADJUSTMENTS	
Position Control Lever	46
Rate of Lower	46
PTO Shift Lever	46
PTO Safety Start Switch	46
Fan Belt	47
Engine Clutch Pedal	47
Brake Pedal	48
Wheel Tread & Torque	48
Front Wheel Bearings	49
Seat	50
WIRING DIAGRAM	51
MISCELLANEOUS OPTIONAL, & EXTRA EQUIPMENT	
Reinstallation of Rops Protective Frame	54 thru 56
Front Weights	57
Rear Weights	58
METRIC INFORMATION	60 thru 62
TORQUE CHART & CONVERSION CHART	63

SAFETY MEANS

- USE YOUR HEAD to keep yourself and others safe!**
- KNOW and FOLLOW the safety rules and procedures for the job at hand — Short-cuts lead to accidents.**
- THINK about the job you are doing at all times! Routine work does not mean routine thinking.**
- BE ALERT to potential danger situations — Correct them yourself or have them corrected.**
- THE ONLY WAY IS THE SAFE WAY — Use your eyes to find safety hazards before they find you.**

TAKE TIME FOR SAFETY

**BE A SAFE OPERATOR
AVOID ACCIDENTS BY
THINKING BEFORE ACTING
AND BY READING YOUR OPERATOR'S MANUAL**

NOTE: Some illustrations in this manual show units with optional equipment installed. This optional equipment may be purchased from your local authorized Dealer.

NOTE: Some photographs in this manual were taken of prototype models. Production models may vary in some detail.



CAUTION: Some photographs in this manual may show shields or cover panels removed for purposes of clarity. NEVER OPERATE Unit without all shields and cover panels in place.



SAFETY PRECAUTIONS

**ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!**

This symbol is used to call your attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol - Heed Its Warning.

Many hours of lost time and much suffering is caused by the failure to practice simple safety rules.

IT IS TOO LATE TO REMEMBER WHAT SHOULD HAVE BEEN DONE AFTER THE ACCIDENT HAS HAPPENED.

1. **STUDY** this Operator's Manual. **LEARN** how to use the tractor controls for safe operation.
2. **TRACTOR** should be operated only by those who are responsible, have been instructed thoroughly in tractor's operation, and have been authorized to operate it.
3. **ONLY** one person, the operator, should be permitted on tractor when tractor is in motion. **NEVER CARRY PASSENGERS.**
4. **USE** the platform to get on and off the tractor.
5. **START** engine from operator's seat only. **PLACE** gear shift lever in NEUTRAL disengage engine clutch and place PTO shift lever in **DISENGAGED** (off) position to close starting circuit.
6. **DO NOT** by-pass the safety starting switches. If they malfunction, check with your authorized dealer and have proper repairs made.
7. **BEFORE** starting tractor in motion, look around carefully to make sure no person or obstruction is in your path of travel.
8. **ALWAYS** drive the tractor at safe speeds for the type of ground it is traveling on. The rate of travel on hillside or curves should be regulated so there is no danger of tipping.
9. **USE CARE** when operating on steep grades to maintain proper stability.
10. **ALWAYS** keep the tractor in gear when going down hill. **NEVER** permit tractor to coast with clutch disengaged or with transmission in neutral.
11. **DO NOT** drive too close to the edge of a ditch or creek.
12. **BEFORE** leaving tractor seat **ALWAYS PLACE TRANSMISSION SHIFT LEVER IN NEUTRAL**, disengage P.T.O., set brakes, and stop engine unless specifically instructed in the Operator's Manual of some machine or attachment to do otherwise.
13. **NEVER** start a P.T.O. driven machine without making sure that no one is on it or close to it.
14. **NEVER** permit anyone to examine, clean, service, or adjust the tractor or any equipment operated by it **UNTIL** tractor engine is stopped, **TRANSMISSION SHIFT LEVER IS IN NEUTRAL**, P.T.O. is disengaged, brakes are set, and **ALL** moving parts have stopped.
15. **NEVER** leave equipment in raised position when tractor is parked.
16. **NEVER** leave the tractor unattended without placing **TRANSMISSION SHIFT LEVER IN NEUTRAL**, setting brakes, disengaging P.T.O., stopping the engine, and removing the key.
17. **DO NOT** pull from the rear axle, **PULL ONLY** from the **DRAWBAR** and take up slack in a chain slowly.
18. **DANGER: NEVER, UNDER ANY CIRCUMSTANCES, ATTEMPT TO PULL ANYTHING FROM THE ADJUSTABLE UPPER LINK, THE LIFT SHAFT, THE AXLE OR THE LIFT ARMS.** Hitch loads to tractor **ONLY** at the drawbar except when pulling implements specifically designed for an properly fastened by three point hitch.
19. If the tractor drive wheels are stuck, **BACK OUT** to prevent the tractor from upsetting.
20. Use the **FLASHING WARNING LIGHTS** when traveling on public roads day or night - unless prohibited by law.
21. **ALWAYS** make sure that an S.M.V. emblem is **VISIBLE** from the rear when traveling on public roads.
22. **NEVER** run the tractor engine in a closed building without adequate ventilation, because the exhaust fumes are very injurious to health.
23. **DIESEL FUEL CAN BE DANGEROUS.** **NEVER** fill fuel tank when engine is running, when engine is hot, while near an open flame or when operator is smoking.
24. **DO NOT** fill fuel tank completely to the top if tractor is to be exposed to sun. Fuel will expand and run over. Wipe up any spilled fuel.
25. Keep a **FIRE EXTINGUISHER** handy at all times.

26. **DO NOT** remove radiator cap until after engine has cooled.
27. **NEVER** stand between tractor and drawn implement while tractor is being backed to hitch.
28. **DO NOT** wear loose-fitting clothing that may be blown or drawn into moving parts.
29. **KEEP** tractor and attachments in good operating condition and keep safety devices in place. Use guards as instructed in Operator's Manual.
30. Provide a **FIRST AID KIT**. Treat all scratches, cuts, etc., with the proper antiseptic immediately.
31. **TRACTOR** and attachments should be stopped and inspected for damage after striking a foreign object, and any damage should be repaired before restarting and operating the equipment.
32. **DO NOT** change engine governor settings or over speed engine.
33. A tractor roll-over can result in personal injury or death. For your protection use of roll-over protective structure and seat belt is recommended. Replace seat belt when it becomes worn or frayed.
34. **DO NOT** use a seat belt if tractor is not equipped with roll over protective devices.
35. **ADD** front weight for pulling heavy drawbar loads or mounted tools.
36. **ADD** rear wheel weights for front loader operation or other counterweight.
37. **SET** wheels as wide as practical for the job being done and for **BETTER** stability.
38. **DRIVE SLOWLY** when pulling heavy wheeled loads, especially if trailing vehicle has no brakes. Towed loads that weigh more than the weight of the tractor **SHOULD BE** equipped with an independent braking system.
39. **LONG HAIR** should be tied up short to prevent it from becoming entangled in moving parts.
40. **REPLACE** damaged or lost safety decals immediately.
41. **ALWAYS** lower fully to the ground any unit attached to the draft arms or supported by a remote hydraulic cylinder, or else **BLOCK IT SECURELY** at a workable height before inspecting, adjusting or performing maintenance work.
42. **NEVER** use your hands to seek out escaping hydraulic oil; use a small piece of cardboard or wood. Hydraulic oil escaping under pressure can have enough force to penetrate the skin. This can cause serious personal injury. Hydraulic oil can also infect a minor cut or other opening in the skin. If injured by escaping hydraulic oil, seek prompt medical attention.
43. **KEEP HANDS** away from leaks in high pressure fuel lines. The finely atomized fuel can be ejected with sufficient force to penetrate the skin. This can cause serious personal injury. If injured by escaping high pressure fuel, seek prompt medical attention.

TAKE TIME FOR SAFETY

REMEMBER THAT SAFE OPERATION IS NO ACCIDENT

AVOID ACCIDENTS

**BUILT-IN SAFETY FEATURES CAN BE EFFECTIVE
ONLY IF PROPERLY MAINTAINED AND UTILIZED.**

SAFETY AND OPERATIONAL DECALS



CAUTION: The following safety and operational decals are placed at strategic positions on the tractor to provide the operator with a continual reminder of safe operating practices. If they become damaged or lost replace them immediately. They may be obtained from your authorized Dealer. The part number and location of decal on the tractor are listed under each copy of decal.



No. 2099204 - Located on Position Control Lever Quadrant

⚠ CAUTION

To PREVENT PERSONAL INJURY to you or others follow these instructions:

1. It is YOUR RESPONSIBILITY to read, understand, and follow the safe operating practices defined in the Operator's Manual shipped with this tractor. If the manual is missing or damaged, obtain a replacement from your local authorized dealer.
2. FASTEN SEAT BELT securely if tractor has ROPS.
3. REDUCE SPEED when turning, crossing slopes, and on rough stick or muddy surfaces.
4. STAY OFF STEEP SLOPES.
5. WATCH WHERE YOU ARE GOING, especially at row ends, on roads, and around trees.
6. NO RIDERS should be permitted on farm field equipment.
7. OPERATE TRACTOR SMOOTHLY-- no jerky starts or stops.
8. HITCH ONLY TO DRAWBAR except when using an implement designed for and properly fastened by 3-point hitch.
9. AVOID DITCHES, EMBANKMENTS and HOLES if possible, when operating tractor.
10. SET PARKING BRAKE or PARK LOCK whenever tractor is stopped.
11. KEEP ALL GUARDS IN PLACE when machinery is in operation.
12. STOP ENGINE, disconnect the power source, and WAIT FOR ALL MOVEMENT TO STOP BEFORE SERVICING, adjusting, cleaning or unclogging ANY EQUIPMENT unless specifically instructed in an Operator's Manual to do otherwise.
13. NEVER COAST down hill.
14. MAKE SURE EVERYONE IS CLEAR of machinery before starting engine, engaging power, or operating the machine.
15. USE FLASHING WARNING LIGHTS when operating on high ways except where prohibited by law.
16. NEVER TOW tractor with transmission in gear.
17. DO NOT FILL FUEL TANK while engine is running, while engine is hot, near open flame or while smoking.

No. 273992 - 1 Used - Located on Top of L.H. Wheel Guard



WARNING

To PREVENT PERSONAL INJURY follow these instructions:

1. KEEP ALL power take-off safety SHIELDS in PLACE.
2. This tractor is equipped with a 540 rpm PTO Position and lock drawbar hitch hole 14 inches (356 mm) from end of PTO shaft.
3. PULL ONLY FROM THE DRAWBAR except when using an implement designed for and properly fastened by 3-point hitch.
4. CAREFULLY CHECK OPERATION and maximum lift height of any implement, especially 3-point hitch mounted backhoes, to insure proper clearance with ROPS.

No. 271600 - 1 Used - Located on R.H. Wheel Guard

SAFETY AND OPERATIONAL DECALS



No. 2101472
Located to Right
of Serial No. Plate



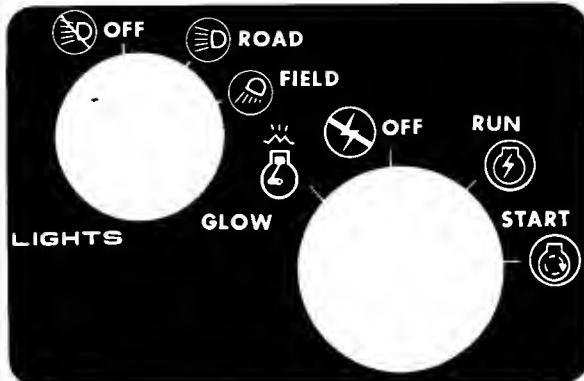
No. 2101474 - Located
on Fuel Tank Cover



No. 2101469
Located on Rate of
Lower Control



No. 2101468 - Located on
Panel Right of Key Switch



No. 2101475 - Located on Instrument Panel

IMPORTANT

Service air cleaner according to instructions contained in the operator's manual. Stop engine, remove and empty dust cup every 10 hours of operation, or more often while operating in extremely dusty conditions.

For maximum engine protection and element life use only filter element part no. 2097371

No. 2101473 - Located on Air Cleaner

SHIFT PATTERN			
MILES/HR		KILOMETRES/HR	
2 H 3.6 C .19 L .9	1 H 2.4 C .14 L .6	RANGE HIGH	2 H 5.8 C .31 L 1.4
3 H 7.7 C .41 L 1.9	H 5.4 C .30 L 1.4	CRAWL	1 H 3.9 C .22 L .99
		LOW	3 H 12.4 C .66 R 3.0
			1 H 8.2 C .48 L 2.2

LAND SPEED @2500RPM WITH 29×12-15TIRES

No. 2097375 - Located on Top of Transmission Cover

SHIFT PATTERN			
MILES/HR		KILOMETRES/HR	
2 H 4.0 C .22 L 1.0	1 H 2.7 C .15 L .7	RANGE HIGH	2 H 6.4 C .35 L 1.6
3 H 8.5 C .46 L 2.1	H 6.1 C .33 L 1.5	CRAWL	1 H 4.3 C .24 L 1.1
		LOW	3 H 13.6 C .74 R 3.4
			1 H 9.1 C .53 L 2.4

LAND SPEED @2500RPM WITH 8-18TIRES

No. 2097370 - Located on Top of Transmission Cover

SAFETY AND OPERATIONAL DECALS

**WARNING**

AVOID POSSIBLE INJURY OR DEATH from a machine runaway.

1. Do not start engine by shorting across starter terminals.

Machine will start in gear and move if normal starting circuitry is bypassed.

2. Start engine only from operator's seat with transmission in neutral or park.

NEVER START ENGINE WHILE STANDING ON GROUND.

No. 272366 - Located on Starter Side of engine on engine side frame



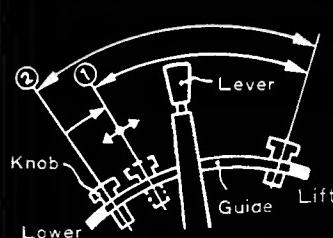
No. 2101477 - Located to Left of PTO Shift Lever

**WARNING**

A tractor roll-over can result in Personal Injury or death.

For your protection use of roll-over protective structure & seat belt is recommended.

No. 2097323 - Located on L.H. Side of Instrument Panel

INSTRUCTION OF THE HYDRAULIC SYSTEM.

1. The height of the implement can be selected by moving and setting the lower knob so that puddling, ridging, and fertilizer distribution can be done easily.

2. If the knob is set at the lowest guide position, it is also possible to control the tilling depth by using a tail wheel.

INSTRUCTION OF THE LOWERING-SPEED CONTROL GRIP

Turning clockwise, the lowering speed is reduced, finally the lowering function is stopped and the implement can not be lowered even if setting the lever low (down).



No. 2101467 - Located on R.H. Wheel Guard

SPECIFICATIONS

	2WD-AG. Tires	2WD Turf Tires	FWA AG. Tires
ENGINE			
Make	Toyosha	Toyosha	Toyosha
PTO Horsepower	15 (11.19 kW)*	15 (11.19 kW)*	15 (11.19 kW)*
Bare Engine Horsepower	18 (13.42 kW)**	18 (13.42 kW)**	18 (13.42 kW)**
Number of Cylinders	3	3	3
Bore	2.87" (73 mm)	2.87" (73 mm)	2.87" (73 mm)
Stroke	3.15" (80 mm)	3.15" (80 mm)	3.15" (80 mm)
Rated Speed RPM	2500	2500	2500
Piston Displacement	61.27 cu. in. (1004 cm ³)	61.27 cu. in. (1004 cm ³)	61.27 cu. in. (1004 cm ³)
Compression Ratio	22.5:1	22.5:1	22.5:1
CAPACITIES			
Cooling System	3.2 qts. Approx. (3 Litres)	3.2 qts. Approx. (3 Litres)	3.2 qts. Approx. (3 Litres)
Fuel Tank	3.7 gal. (14 Litres)	3.7 gal. (14 Litres)	3.7 gal. (14 Litres)
Engine Crankcase			
Oil Change w/Filter	2.3 qts. (2.2 Litres)	2.3 qts. (2.2 Litres)	2.3 qts. (2.2 Litres)
Transmission (Hydraulic System)	18 qts. (17 Litres)	18 qts. (17 Litres)	18 qts. (17 Litres)
FWA			
Differential	--	--	1.6 qts. (1.5 Litres)
Side Gear Case - Each	--	--	.42 qts. (.4 Litres)
GENERAL DIMENSIONS			
Height to Top of ROPS	W/8-18 Rear Tires	W/29 x 12-15 Turf	W/8-18 Rear Tires
Height to Top of Hood (Front) ..	40.9" (1039 mm)	40.9" (1039 mm)	40.9" (1039 mm)
Height to Steering Wheel	46.9" (1190 mm)	46.9" (1190 mm)	46.9" (1190 mm)
Wheelbase	50.8" (1290 mm)	50.8" (1290 mm)	50.8" (1290 mm)
Turning Radius w/Brakes	78.0" (1980 mm)	79.7" (2025 mm)	76.4" (1940 mm)
Minimum Width	40.9" (1039 mm)	48.5" (1231 mm)	48.5" (1231 mm)
Overall Length	82.7" (2100 mm)	82.7" (2100 mm)	82.7" (2100 mm)
Clearance Under Front Axle	13.7" (348 mm)	13.1" (333 mm)	12" (305 mm)
Clearance Under Rear Axle Housing	14.2" (360 mm)	14.2" (360 mm)	14.2" (360 mm)
Approx. Shipping Weight	1278 lbs. (580 kg)	1278 lbs. (580 kg)	1448 lbs. (657 kg)

The Company reserves the right to make changes on the above specifications or add improvements at any time without notice or obligation.

GENERAL INFORMATION

DIESEL FUEL

Fuel used in this Diesel Engine should be Grade No. 2-D as defined by ASTM D975 specification for diesel fuel oils. For maximum performance and fuel filter life, sulfur content should be less than 0.5 percent and water and sediment content should be less than 0.1 percent.

For cold weather operation, below +20° F (-6.7° C). Grade No. 1-D fuel should be used to ensure ease of starting and proper fuel flow. Fuel pour point should be + 10° F (5.6° C) below lowest expected ambient temperature.

FUEL STORAGE

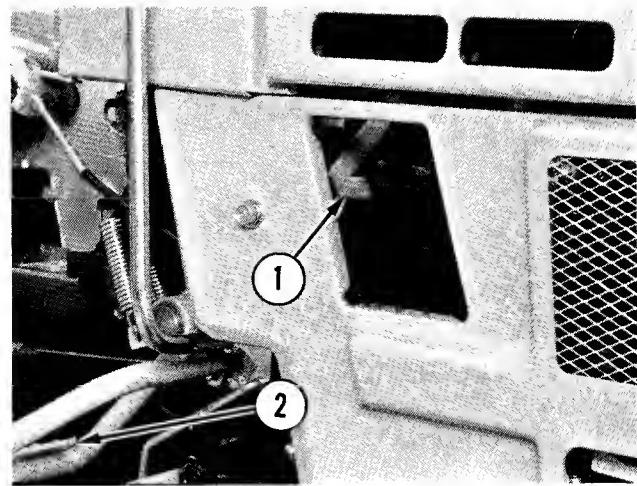
The importance of proper fuel storage cannot be too strongly stressed. Storage tanks, drums or portable service tanks must be free from rust, scale, sediment or any other foreign matter which will contaminate the fuel. Contaminated fuel will clog the fuel filter and eventually damage the fuel injection pump and fuel nozzles.

NOTE: If fuel is to be stored more than 3 months it should be treated with diesel fuel conditioner as a protection against wax and gum build up and water contamination.

METRIC INFORMATION



CAUTION: This product contains some parts dimensioned in the Metric System as well as in the U.S. Inch System. Some fasteners are metric and are very close in dimensions to familiar fasteners in the U.S. Inch System. It is important to note that, during any repair or maintenance procedures, replacement fasteners must have the same measurements and strength as those removed, whether metric or U.S. Inch System. Mismatched or incorrect fasteners can result in damage or malfunction, or possible personal injury. Therefore, fasteners removed from the machine should be saved for reuse in the same locations. Where the fasteners are not satisfactory for reuse, care should be taken to select a replacement that matches the original. For information and assistance, see your authorized dealer.



T-69367

R.H. VIEW

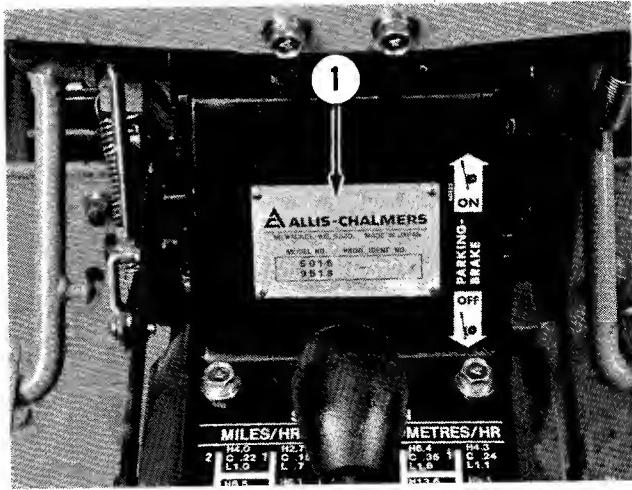
1. Hood Latch Handle

2. Brake Pedal

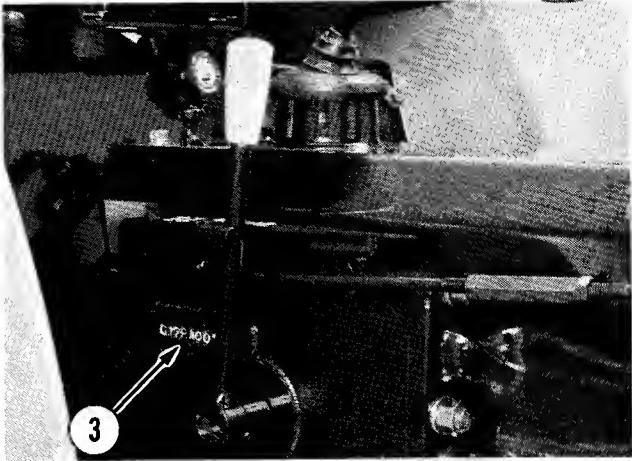
ENGINE HOOD LATCH

The engine hood must be raised to inspect and service engine.

To open hood pull up on hood latch handle (1) and raise hood. The hood can be locked in raised position with a lock rod (Not Shown). When closing hood, release lock rod and push down on rear area to lock in closed position.



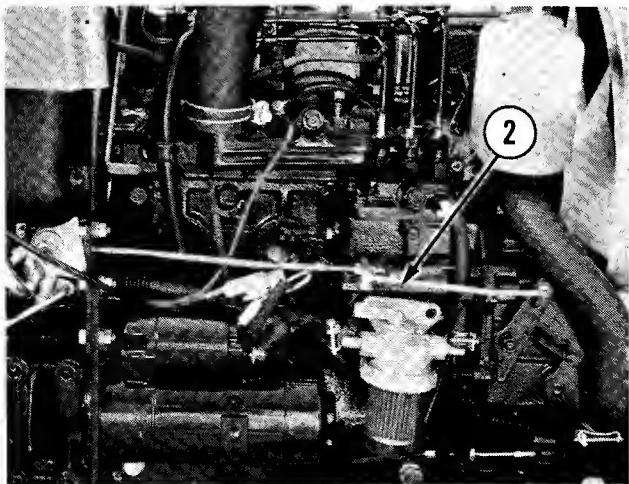
T-69363

1. (PIN) Number

T-69365

3. Transmission Serial Number**GENERAL INFORMATION**

READ THIS MANUAL CAREFULLY EVEN IF YOU HAVE OWNED SIMILAR TRACTORS. THIS MANUAL SHOULD BE KEPT AS A HANDY REFERENCE FOR MAINTENANCE AND LUBRICATION.



T-69359

2. Engine Model & Serial Number

This tractor is built rugged to give a long, trouble-free life in many different work applications. This tractor is tough, however, it should be remembered that neglected maintenance and abuse will shorten the service life of tractor and incur more repair expense.

The warranty does not cover parts failure caused by abuse or failure of the owner to properly maintain his tractor.

RIGHT AND LEFT

When reference is made concerning right and left of the tractor this is determined when sitting in Operator's seat and facing front of tractor.

1. The Model number and Serial Number of your tractor appears as the Product Identification Number (PIN) and is stamped on a name plate located on rear surface of the steering shaft support facing operator.

Give the complete number as stamped. Example: 5015-1001 for Model 5015 or 9518-1001 for Model 9518.

2. The Engine Model and Serial Number is located on R.H. side of the cylinder block. Example: CS100-001001.
3. Transmission Model and Serial Number is located on R.H. side of the transmission housing.

MEMO

Lubrication and Service



T-69381



CAUTION: To prevent personal injury, never permit anyone to examine, clean, service, or adjust the tractor or any equipment operated by it UNTIL tractor engine is stopped, brakes are set, transmission shift lever is in neutral, P.T.O. is disengaged, and all moving parts have stopped.

The following section deals with lubricating and servicing your tractor. Be sure to follow the recommended time intervals and use the type of lubricants that are recommended.

The few dollars you may save by using cheaper lubricants or not following the recommended change intervals may cost you many dollars later on.

In order for your tractor warranty to be valid the recommended time intervals must be followed and the recommended types of lubricants must be used!

LUBRICATION & SERVICE

TIME INTERVAL CHART FOR SERVICE ITEMS

10 HOURS OR DAILY

Air Cleaner Cup - Clean
Engine Cooling System - Check coolant level
Engine Oil Level - Check
Front Axle and Steering Linkage - Grease
(7 fittings 2 WD) (6 fittings - FWD)
3-Point Hitch - Grease 2 fittings and lubricate
8 bushings
Fuel Sediment Bowl - Check and clean if needed
Transmission Oil Level - Check (includes oil for
transmission and hydraulic lift system)
FWD Axle Oil Level - Check

20 HOURS

Engine Oil & Filter - first change at 20 hours
on new tractor

50 HOURS

Engine Oil & Filter - change (after first change)
Transmission and Hydraulic Oil (New Tractor)
Change oil and filter first time at 50 hours.
Fuel Filter (New Tractor) - change fuel filter first
time at 50 hours
Clutch - Brake Shaft Assembly - grease 3 fittings
Battery - Check electrolyte level
FWD Axle Oil - Change oil first time at 50 hours

100 HOURS

Air Cleaner Element - Clean

200 HOURS

Crankcase Breather tube - Remove and Clean
Transmission and Hydraulic Oil - Change oil and filter
(after first change)
Injection Pump Oil - Change
FWD Axle Oil - Change Oil (after first change)

YEARLY

Front Wheel Bearings - Clean and repack
(2 WD or 300 hours, which ever comes first)
Fuel Filter - change (after first change)
or 400 hours, whichever comes first
Air Cleaner Element - Change

2 YEARS

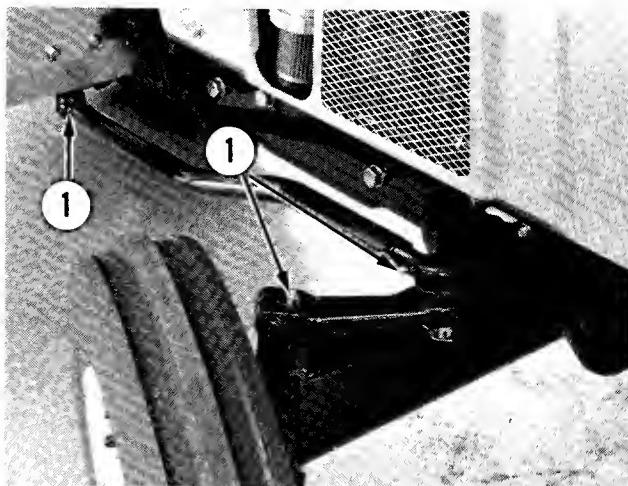
Engine cooling system - drain and refill

LUBRICATION AND SERVICE GUIDE

SUBJECT	SERVICE OR LUBRICANT	INTERVAL	CAPACITIES
Engine Oil and Oil Filter	CD (DS Series 3) Class Oil	Check oil level every 10 hrs. or daily. On a new tractor change oil and filter after the first 20 hrs. of operation. After this initial change, oil and filter should be changed every 50 hrs.	2.3 qts. (2.2 litres) w/filter
Air Cleaner Cup	-----	Clean every 10 hrs. or daily	-----
Air Cleaner Element	New element from your Authorized Dealer.	Clean as required - replace every year or after six cleaning, whichever occurs first.	-----
Engine Cooling System	Permanent type anti-freeze	Check level every 10 hrs. or daily - Maintain coolant level between "FULL" & "ADD" marks on overflow bottle. Drain and refill every 2 years.	Approx. 3.2 qts. (3 litres)
Transmission - Hydraulic Oil & Filter	Allis-Chalmers Power Fluid 821 or Simplicity Multi-purpose Hyd. Transmission Oil.	Check level every 10 hrs. or daily. Change oil and filter at first 50 hrs. of operation and every 200 hrs. thereafter.	4.5 gal. (17 litres)
Injection Pump	CD (DS Series 3) Class Oil	Change oil every 200 hrs.	7 fl. oz. (200 ml)
Sediment Bowl	-----	Check and clean if needed every 10 hrs. or daily.	-----
Fuel Filter	Filter from your authorized Dealer.	Replace after first 50 hrs. of opeation and yearly or every 400 hrs. thereafter.	-----
Battery	Clean distilled water only.	Check level of electrolyte solution once a week (50 hrs.) - add distilled water when necessary.	-----
Front Wheel Bearings	No. 2 wheel bearing grease	Clean and repack yearly or every 300 hrs. or oftener in extremely wet or muddy conditions. Check and adjust the wheel bearings periodically.	-----
Front Axle	Multi-purpose grease	Lubricate Daily (every 10 hrs.) (7 fittings) 2WD (6 fittings) FWD	-----
3-Point Hitch	Multi-purpose grease	Lubricate Daily (every 10 hrs.) (2 fittings)	-----
Clutch - Brake Shaft Assembly	Multi-purpose grease	Lubricate Weekly (every 50 hrs. (3 fittings)	-----
FWD Axle	Allis-Chalmers Power Fluid 821 or Simplicity Multi-purpose Hyd. Transmission Oil.	Change after first 50 hrs. of operation and every 200 hrs. thereafter	1.6 qt. (1.5 litre) axle housing .4 qt. (0.4 litre) lock final drive housing

*Capacities listed here are approximate. Use dipsticks, sight gauges or level plugs for proper fill.

LUBRICATION & SERVICE



T-69343

FIGURE 1 - R.H. Side

1. Lube Fittings

CAUTION: NEVER ATTEMPT TO CLEAN LUBRICATE OR ADJUST THIS MACHINE WHILE IT IS IN MOTION OR ENGINE IS RUNNING.

FRONT AXLE (Figures 1, 2)

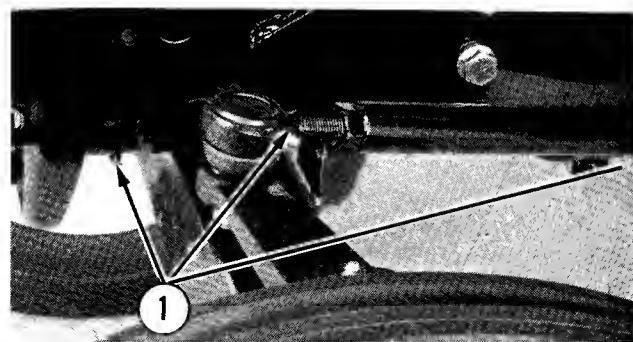
Lubricate daily (10 hours) with multi-purpose grease, seven lube fittings, one on each spindle support end one on the axle front pivot, two on each tie rod. (Six lube fittings on FWD, two on each tie rod, two on axle front pivot).

3-POINT HITCH (Figure 3)

Lubricate daily (10 hours) with multi-purpose grease, lube two fittings one at upper link and one on R.H. lift link. Lubricate bushings by applying a thin film of light weight oil to ends of draft arms (4), upper link (2) and top ends of lift links (2). (8 total).

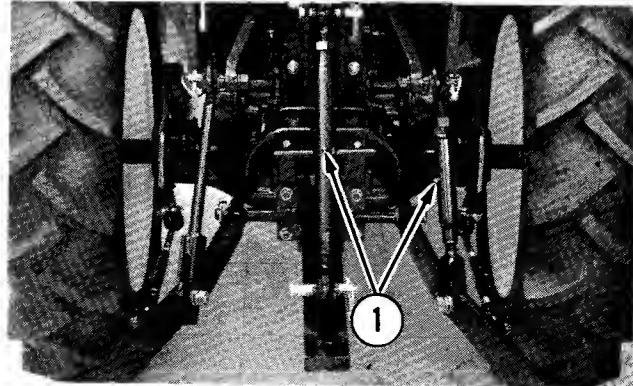
CLUTCH – BRAKE SHAFT ASSEMBLY (Figure 4)

Lubricate daily (50 hours) with multi-purpose grease. Lube three fittings, one on clutch pedal, one on pedal shaft support and one on R.H. pedal.



T-69344

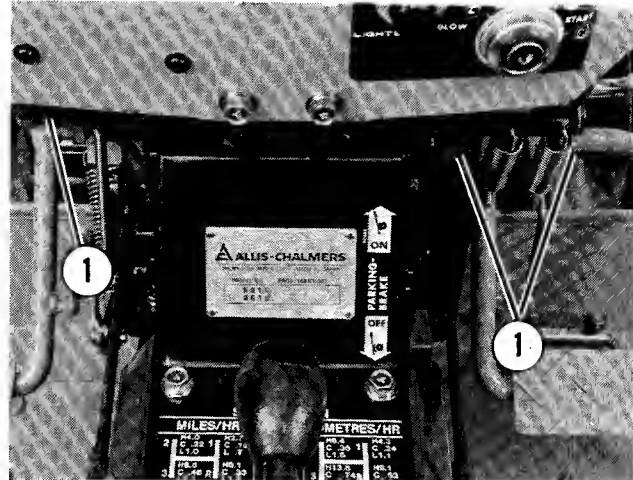
FIGURE 2 - L.H. Side
1. Lube Fittings



T-69375

FIGURE 3 - Rear View

1. Lube Fittings



T-69363

FIGURE 4

1. Lube Fittings

ENGINE COOLING SYSTEM (Figures 5 & 6)

Check cooling system daily (10 hours) for correct coolant level. Maintain coolant level between "FULL" & "ADD" marks on overflow bottle located in front of radiator.

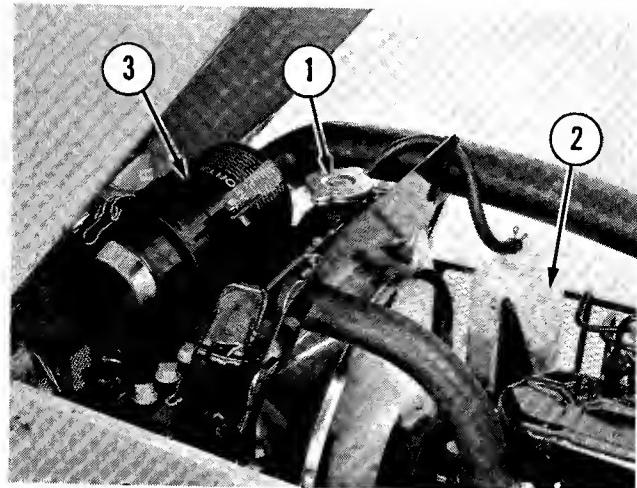


WARNING: DO NOT remove radiator cap while engine is hot. Radiator is pressurized; if opened while hot, steam and boiling liquid will be sprayed out, which may injure you and which will cause excessive loss of coolant.

The cooling system is filled at the factory with a permanent-type anti-freeze solution which protects cooling system to -20° F (-20° C).

A drain cock is located at R.H. of frame. It drains radiator & block. Open drain cock when draining cooling system, and remove radiator cap to prevent air locking which will retard draining.

In warm areas where anti-freeze is not needed to prevent freezing, it is recommended that the cooling system consist of at least one-third anti-freeze solution to prevent cooling system rust and corrosion. The rust and corrosion inhibitors in anti-freeze lose their effectiveness after approximately two years. Therefore, the cooling system should be drained and refilled with proper amount of new anti-freeze solution every two years. **IMPORTANT:** The use of a 100% anti-freeze solution in cooling system is not recommended since a certain amount of water is necessary to make anti-freeze effective. Always use a permanent-type anti-freeze.

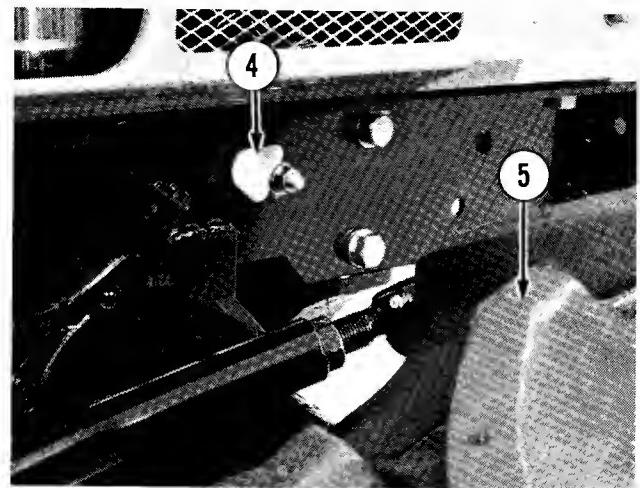


T-69350

FIGURE 5 - Hood Opened for Clarity

1. Radiator Cap
2. Overflow Bottle

3. Air Cleaner



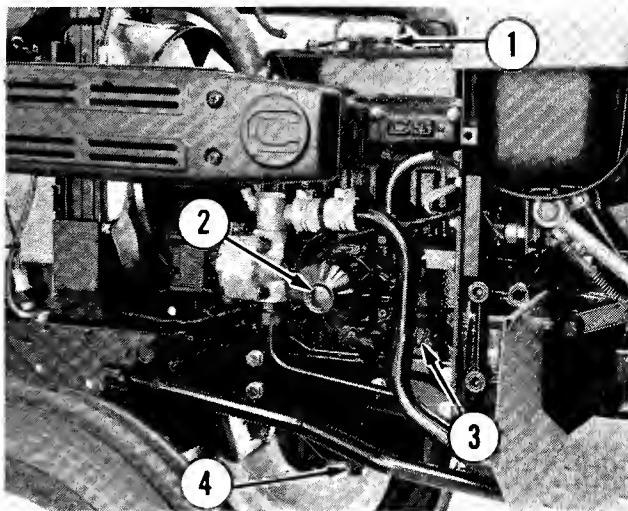
T-69351

FIGURE 6 - R.H. Side

4. Drain Cock

5. R.H. Front Wheel

LUBRICATION & SERVICE



T-69352

FIGURE 7 - L.H. Side

- | | |
|------------------------|------------------------|
| 1. Engine Oil Fill Cap | 3. Engine Oil Dipstick |
| 2. Oil Filter | 4. Engine Oil Drain |

CHECK ENGINE OIL LEVEL (Figure 7)

Check the engine oil level daily (10 hours).

The dipstick is marked on both sides for reading the oil level with the engine stopped.

Before checking oil level, allow at least 10 minutes for oil to return to sump after stopping engine.

Do not overfill. Use oils of the CD (DS Series 3) service classification only. Use the following viscosities for the lowest expected temperature during time oil will be in crankcase.

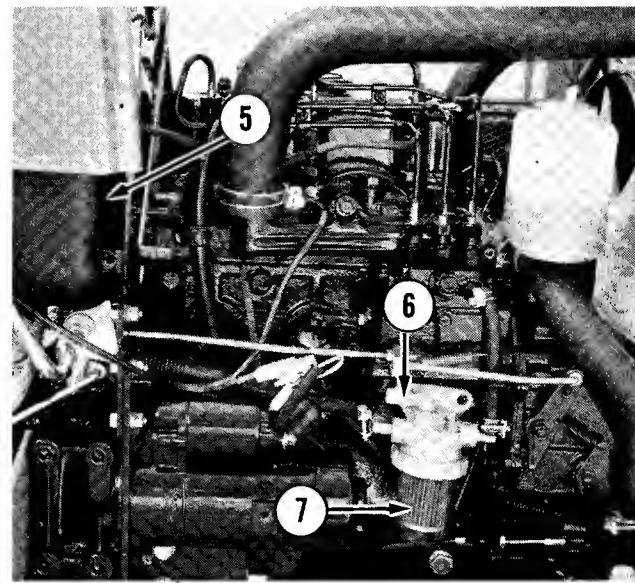
DO NOT use multi-viscosity oils in this diesel engine. (See Special Lubrication Information).

ENGINE OIL (Expected Temperature During Time Oil Will Be in Crankcase)	RECOMMENDED OIL VISCOSITY
Above 32° F (0° C)	SAE 30
0° to 32° F (-18° to 0° C)	SAE 20-20W
0° and Below (-18° C and below)	SAE 10W

Drain and refill crankcase with fresh clean oil after the first 20 hours of operation. After that, every 50 hours. Drain plug is located at bottom of crankcase (Figure 7).

ENGINE OIL FILTER (Figure 7)

Replace the oil filter at the first 20 hours of operation when the engine oil is changed and every 50 hours thereafter. Replace only with a filter provided specifically for your engine.



T-69359

FIGURE 8 - R.H. Side

- | | |
|------------------|--------------------------------|
| 5. Fuel Tank | 7. Sediment Bowl & Fuel Filter |
| 6. Fuel Shut-Off | |

ENGINE FUEL SEDIMENT BOWL AND FILTER (Figure 8)

The fuel system is equipped with a fuel shut-off valve, a fuel sediment bowl and a fuel filter located at the R.H. side of engine. See Figure 8.

The purpose of the fuel shut-off valve is to stop flow of fuel from tank when the sediment bowl or filter is removed or when fuel lines are removed.

The purpose of the sediment bowl is to filter out sediment and water from the fuel before it enters the fuel filter. Check the sediment bowl daily. If it contains sediment or water close the fuel shut-off valve. Thoroughly clean gasket and bowl and replace the parts in the same position from which they were removed. Before attempting to start the engine be sure to follow the procedure for bleeding air from the fuel system given below.

If dirt, sediment or water is found in filter bowl each day, it indicates fuel is contaminated and method of handling and storage of fuel should be improved. If fuel is clean, very little sediment or water will be found in the sediment bowl and cleaning period may be extended accordingly.

The purpose of fuel filter is to remove sediment and small abrasive particles from fuel before it enters and damages fuel injection pump. On a new engine fuel filter should be removed and replaced at first 50 hours. Thereafter, filter should be changed yearly or at every 400 hours of operation. To replace filter:

1. Shut-off fuel at the sediment bowl.
2. Wipe all dirt from the fuel filter assembly. Remove filter element and discard element and gasket.
3. Install a new filter element and new gasket obtained from your authorized dealer. Before tightening filter in place, turn on fuel at fuel shut-off valve until new filter is filled with fuel, then securely hand tighten retainer onto filter head. Before attempting to start engine be sure to follow the procedure for bleeding air from the fuel system, given below.

Poor fuel handling and storage facilities will decrease fuel filter life and require replacement more frequently. When abnormal loss of speed and/or engine power is observed check and clean fuel sediment bowl. If loss of power continues, replace fuel filter element. To continue operating with a plugged filter may allow dirt to be forced through and cause severe damage to fuel injection pump.

TO BLEED AIR FROM THE FUEL SYSTEM (Figures 8 & 9)

Each time sediment bowl is cleaned or fuel filter replaced bleed air from fuel system as follows:

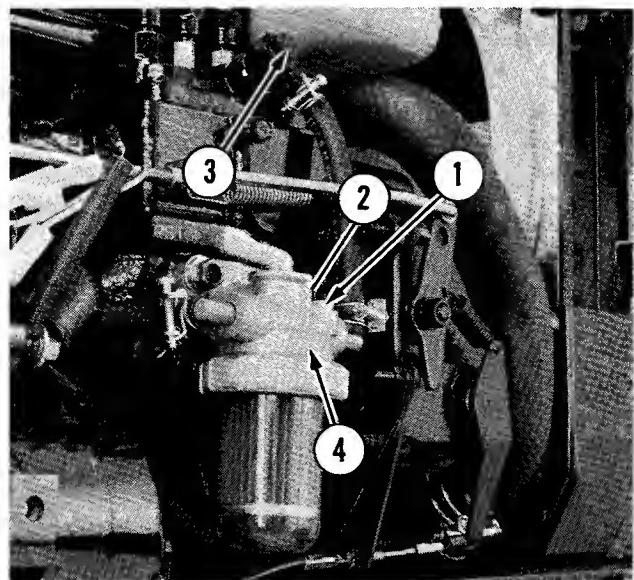
1. Make sure fuel tank is full and shut-off valve is open for full fuel flow.
2. To bleed air from fuel line, loosen the two fuel bleed screws (1 & 2) on fuel filter head and when air free fuel appears, tighten bleed screws (1 & 2).
3. Loosen bleed screw (3) at injection pump and when air free fuel appears, tighten bleed screw (3).
4. Start the engine. If engine fails to start after a reasonable cranking period, there may be some air bubbles in the high pressure injection lines. Partially loosen the high pressure lines where they attach to injector nozzles and turn engine over several times. Tighten lines and start engine.

IMPORTANT: DO NOT allow engine to run out of fuel. To do so may seriously damage the fuel injection pump. Keep track of the fuel supply in the tank and when it gets low stop engine until tank is refilled.

FRONT WHEEL BEARINGS (2 WD ONLY) (Figure 10)

Remove, clean and repack the front wheel bearings with No. 2 Wheel Bearing grease every 300 hours of operation or once a year. In extremely wet or muddy conditions service the bearings more often. Always replace the seals when repacking the bearings.

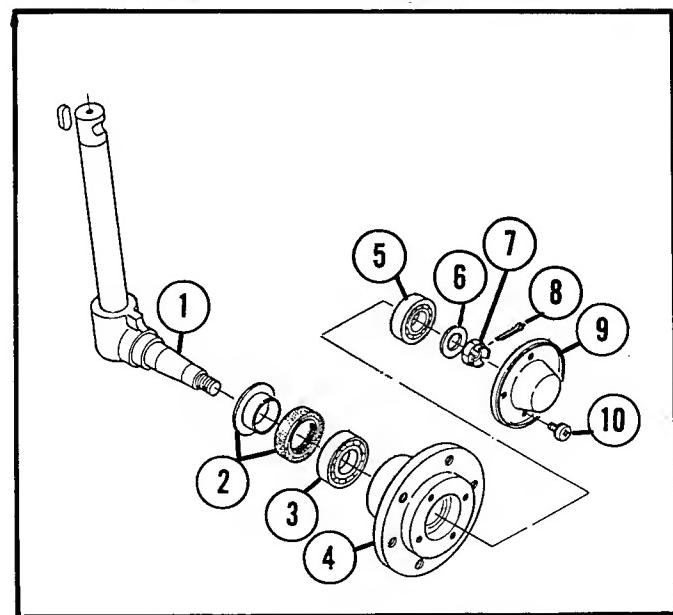
To adjust the wheel bearings proceed to adjustment section.



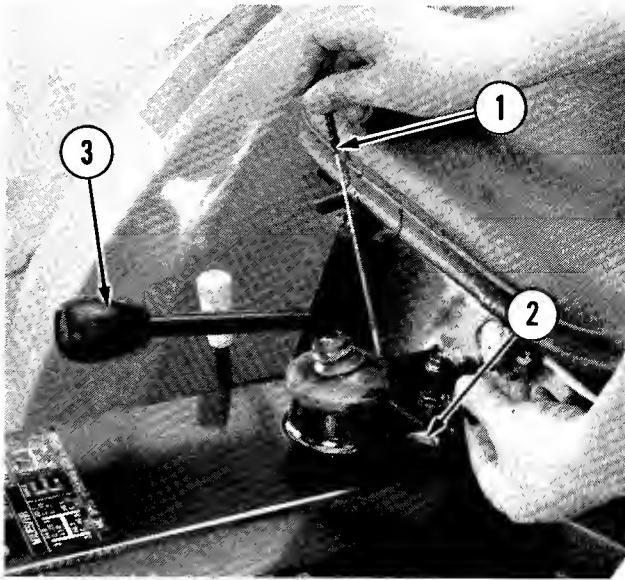
T-69362

FIGURE 9 - R.H. Side of Engine

- | | |
|----------------|---------------------|
| 1. Bleed Screw | 3. Bleed Screw |
| 2. Bleed Screw | 4. Fuel Filter Head |

**FIGURE 10 - Front Wheel Hub Assembly**

- | | |
|------------|---------------|
| 1. Spindle | 6. Washer |
| 2. Seal | 7. Nut |
| 3. Bearing | 8. Cotter Pin |
| 4. Hub | 9. Cap |
| 5. Bearing | 10. Screw |



T-69355

FIGURE 11 - L.H. Side

1. Transmission & Hydraulic Oil Dipstick
2. Transmission & Hydraulic Oil Fill
3. Shift Lever

TRANSMISSION & HYDRAULIC SYSTEM OIL LEVEL (Figures 11 & 12)

The transmission oil is also used to operate the hydraulic system of the tractor. The oil should be kept clean and up to level at all times.

There is an oil level dipstick on top of transmission, (Figure 11). Maintain oil to level mark. Check oil level every 10 hours or daily when tractor engine has been stopped for at least five (5) minutes and lift arms are in lowered position.

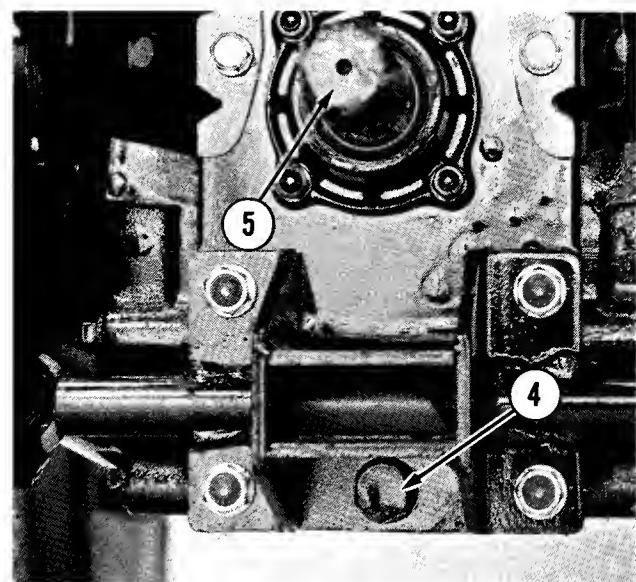
The oil fill plug is located near transmission shift lever (Figure 11). Fill with Allis-Chalmers Power Fluid 821 or Simplicity Multipurpose Hydraulic Transmission Oil.

TRANSMISSION, HYDRAULIC SYSTEM OIL & FILTER (Figure 13)

The transmission and hydraulic oil should be changed after the first 50 hours of operation and every 200 hours thereafter. Also change hydraulic filter (6) at this time.

1. Remove drain plug and drain oil from the transmission and hydraulic sumps (approximately 4.5 gals. (17 litres)). Replace hydraulic oil filter (6).

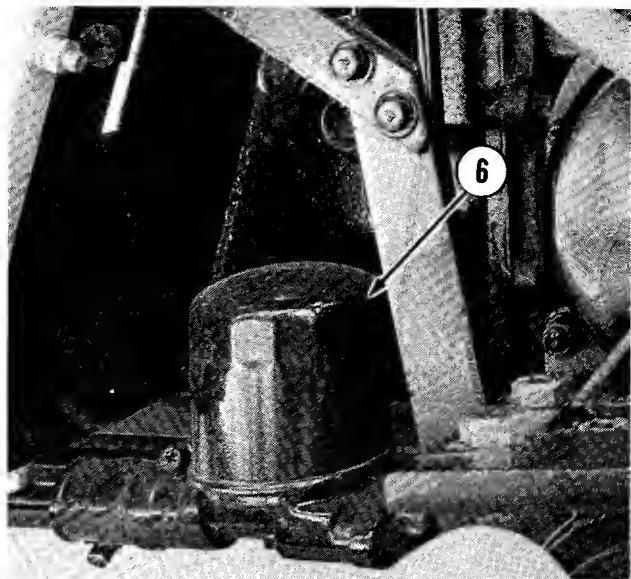
IMPORTANT: Replace hydraulic oil filter only with filter provided specifically for your tractor.



T-69354

FIGURE 12 - Rear View

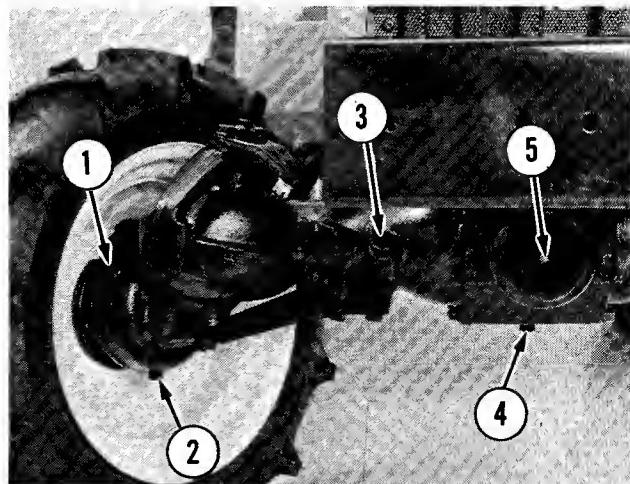
4. Transmission & Hydraulic Drain Plug
5. P.T.O. Shaft



T-69101

FIGURE 13 - L.H. View

6. Hydraulic Oil Filter
2. Install and tighten drain plug and refill the transmission and hydraulic sump with approximately 4.5 gal. (17 litres) of Allis-Chalmers Power Fluid 821 oil. Start engine and operate for 3 minutes at 1/2 throttle this will allow pump to fill the hydraulic system. Stop engine and wait five (5) minutes and then check oil level. The oil level should be in flat area of dipstick. If not add enough oil to bring oil level up to flat area of dipstick.



T-69357

FIGURE 14 - Front View - Front Drive Axle

1. R.H. Final Drive Fill & Level Plug
2. R.H. Final Drive Drain Plug
3. Axle Housing Fill & Level Plug
4. Axle Housing Drain Plug
5. Front Pivot Lube (2 Fittings)

FRONT AXLE DRIVE (Figure 14)

Check front axle drive oil levels once every 10 hours of operation. With tractor on level ground, check all three level plugs for proper oil fill. Change oil first time after 50 hours of operation and every 200 hours thereafter.

NOTE: Each final drive must be filled and checked separately. Fill to each level plug with Allis-Chalmers Power Fluid 821 or Simplicity Multipurpose Hydraulic Transmission Oil. Lube front and rear pivots once daily.

BATTERY (Figure 15)

The battery is mounted in front of the radiator.



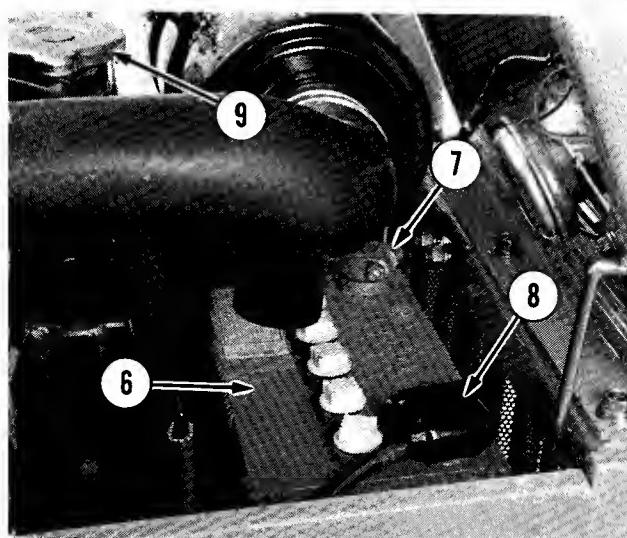
CAUTION: Batteries produce explosive gases. Keep flames, sparks and smoking material away from batteries. Ventilation is required, when charging or storing batteries.



DANGER: Fluid in electric storage batteries contains sulfuric acid which can cause SEVERE BURNS. AVOID all contact of fluid with eyes, skin, or clothing. If contact does occur, flush off immediately with large amounts of water. Get prompt medical attention. KEEP OUT OF THE REACH OF CHILDREN.

Keep the battery and terminals clean. If terminals become corroded, or if battery becomes acid soaked, wash with a mixture of baking soda and water. The vent plugs must be in place when cleaning batteries. Check the gas escape holes in vent caps to make sure they are open.

Check level of electrolyte solution in batteries at least once a week (50 hours) to make sure it is at proper



T-69358

FIGURE 15 - Battery - Hood Open

- | | |
|-----------------------|----------------------|
| 6. Battery | 8. Positive Terminal |
| 7. Negative Terminals | 9. Radiator |

level. The electrolyte should be maintained at the indicator level in each cell, which is approximately 3/8" (10 mm) above top of separators. Never add anything to battery solution except clean distilled water. Clean containers and filling equipment must be used.

In cold weather, add water to batteries only prior to operating engine so that charging will mix electrolyte and water to prevent freezing. A fully charged battery will not freeze in cold temperature, but, if only partly charged, will freeze and be damaged, even at temperatures only slightly below freezing.

If batteries are removed from tractor, disconnect negative ground cables from battery terminals first. Upon reinstalling batteries, connect ground cables last and connect to negative terminal of batteries. The battery retainer should be in place and tightened snugly to prevent batteries from damage caused by vibration.

In the event the tractor is not being used for a long period of time, it is advisable to remove and clean the batteries. Have them fully charged and stored in a well vented basement or some similar place where the temperature will be as low as possible, but above freezing.

When using a booster battery or auxiliary starting power as a starting aid, do the following:

1. Make certain transmission is in neutral, PTO is disengaged and park brake is set.
2. DO NOT connect across terminals on starter.
3. Attach one cable to positive (+) terminal of tractor battery and to positive terminal of booster battery or auxiliary starting power.

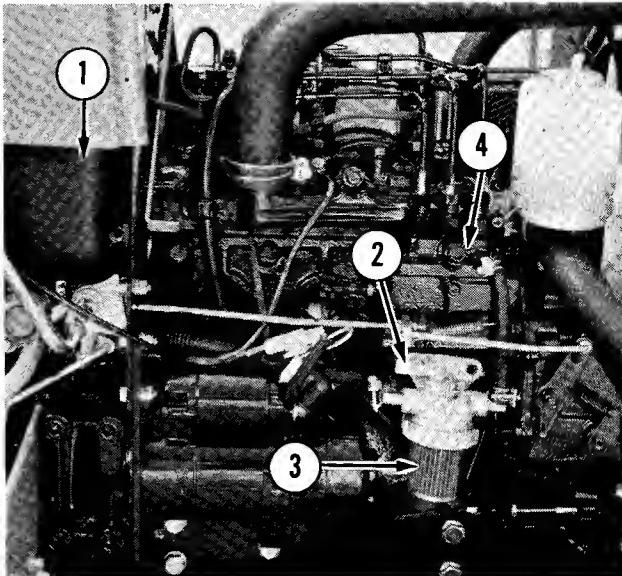
LUBRICATION & SERVICE

4. Attach one end of other cable to negative (-) terminal of booster battery and other end to tractor frame or other good ground away from tractor battery. DO NOT attach to negative terminal of discharged battery.
5. Start engine from operator's seat using recommended starting procedures.



WARNING: The engine can be started with transmission in gear when safety switches are bypassed. Unexpected movement of tractor and connected equipment can cause personal injury or death to operator and bystanders.

6. Disconnect booster battery or auxiliary starting power cables in reverse order from steps 3 and 4.



T-69359

FIGURE 16 - R.H. Side

- | | |
|-------------------|---------------------------|
| 1. Fuel Tank | 3. Sediment Bowl & Filter |
| 2. Shut-off Valve | 4. Injection Pump |

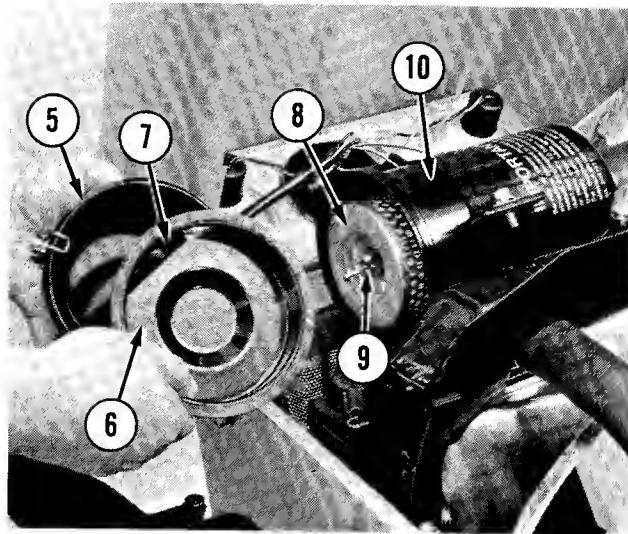
FUEL TANK (Figure 16)

The tractor is equipped with a fuel tank located just forward of instrument panel. Fill the fuel tank at the end of each day's operation. This will help to prevent condensation and moisture from collecting in the fuel system. Excessive moisture in the fuel system clogs fuel filter and may damage fuel injection equipment.

There is a fuel shut-off valve and sediment bowl with filter located below injection pump. Check sediment bowl daily for excessive sediment and clean if necessary.



CAUTION: Diesel fuel can be dangerous. Never fill fuel tank when engine is running, when engine is hot, while near an open flame, or when operator is smoking. DO NOT OVERFILL TANK.



T-69360

FIGURE 17 - L.H. View

- | | |
|----------------|--------------------------|
| 5. Cup | 8. Filter Element |
| 6. Dirt Baffle | 9. Wing Nut |
| 7. Slot | 10. Air Cleaner Assembly |

AIR CLEANER – DRY TYPE (Figure 17)

The engine is equipped with a dry-type air cleaner with a removable filter element that can be cleaned and reused. Proper servicing of the air cleaner will greatly increase the period between engine overhauls and will reduce downtime. Because some engines operate constantly in a dusty atmosphere and others operate in relatively clean air, each engine air cleaner will require servicing at different intervals.

SERVICING AIR CLEANER CUP (Figure 17)

Clean the air cleaner cup daily, or as often as needed, to prevent dust from building up closer than 1/2" (13 mm) from the slot in the baffle support. The air cleaner element will not need to be cleaned as often, if the air cleaner cup is cleaned regularly.

To service the air cleaner cup, stop the engine and open the hood. Unfasten clamps, and remove the dust cup.

Remove the dirt baffle from the air cleaner cup and dump out the dirt. Wipe the baffle and cup clean with a dry cloth; do not use an oil saturated cloth. Replace the baffle in the cup, making sure that it is properly seated. Reinstall the air cleaner cup on the air cleaner housing, making sure the slot in the baffle support is at the top, and with the arrows and the word "Top" on the air cleaner cup pointing upward. Fasten the clamps. Then close the tractor hood.

NOTE: Align tab of baffle and notch of air cleaner housing when replacing cup.

SERVICING AIR CLEANER ELEMENT (Figure 17)

Open the hood and remove the air cleaner cup. Remove the wing nut at end of element and remove the element from the air cleaner housing.

Washing in water or blowing with compressed air are the two preferred methods for cleaning. If the element regularly contains substantial amounts of soot or oil fumes, washing in water works better than compressed air. If the contaminant on the element is mostly dust, either method works well. Elements that are cleaned with compressed air can be put back into service immediately. Water cleaned elements must be dried before they can be used; therefore it is a good practice to keep an extra element on hand to use while the washed element is drying.

The filter element is partially covered by a plastic sleeve with fins. The covered portion can be cleaned with water or air without removing the sleeve. Use a stiff fiber (not wire) brush to remove oil and grease deposits from the sleeve and fins.

IMPORTANT: Do not remove plastic sleeve and fins from the element.

Cleaning with Compressed Air

Direct a jet of clean, dry air from the inside of the filter element, perpendicular to the pleats.

IMPORTANT: Pressure at air nozzle must not exceed 100 PSI (690 kPa).

Move the air jet up and down along the inside of pleats, slowly rotating the element, until no more dust is being removed. Time required is approximately 10 minutes.

IMPORTANT: Be careful to see that the element is not ruptured by the nozzle or the air jet. NEVER direct air jet against the outside surface of filter.

Cleaning with Water

Filter elements can be cleaned by washing with water and a good non-sudsing detergent. If compressed air is available, first direct a jet of clean, dry air from the inside of the filter element. When the loose dust and soot have been removed, the element is ready to be washed.

First dissolve the detergent in a small amount of cool water. Then add warm (approximately 100° F (30° C) water to get the proper proportions of detergent and water. Soak the element in the solution for at least 15 minutes. Then agitate the element for about two (2) minutes to loosen the dirt.



CAUTION: Never use gasoline or solvents to clean elements.

Rinse the element with clean water until the water coming through the element is clean. Water pressure from a hose or tap should not be over 40 PSI (276 kPa). Air-dry the element thoroughly before using.

NOTE: Mechanized drying methods can be set up; however, heated air (maximum temperature 180° F (82° C) must have some circulation. Do not use light bulbs for drying the element.

Inspecting the Cleaned Filter Element

After cleaning the filter element, using either air or water, inspect the element for damage. Look for dust on the clean air side, the slightest rupture, or a damaged gasket. A good method to detect ruptures in the element is to select a dark place, place a light inside the element, and look toward the light from the outside. Any hole in the element, even the smallest, will pass dust to the engine and cause unnecessary wear.

INSPECTING AIR INDUCTION SYSTEM

The air induction system should be periodically checked for parts that may be worn, missing, or damaged. Hoses, gaskets, and connections particularly should be checked for possibility of an air leak. Any air leak that is detected should be corrected before operating the engine.

REINSTALLING THE FILTER ELEMENT (Figure 17)

Thoroughly clean the inside of the air cleaner housing before reinstalling the filter element. Be sure the gasket on the filter element is in good condition; then install the filter element, tightening with the wing nut. A gasket must be between the wing nut and filter element and must be in good condition.

IMPORTANT: Never operate the engine without a filter element in the air cleaner, and always use genuine filter elements for maximum protection.

Reinstall the air cleaner cup with the markings upward, being sure that the cup makes a tight seal. Close the tractor hood.

IMPORTANT SERVICE INFORMATION

The filter element should be replaced after one year, or after six cleanings, whichever occurs first.

Store filter elements where they are protected from dust and potential damage.

Keep spare elements (new or cleaned) on hand to use while a freshly washed element is drying.

When replacing filter elements, be absolutely sure that the proper element is used. Your authorized dealer can supply you with the proper element.

ALTERNATOR

The alternator is used in the electrical charging system and requires no lubrication. The alternator and regulator are designed for use on only one polarity system. This tractor utilizes a negative ground system. The following precautions must be observed when working on the charging circuit. Failure to observe these precautions will result in serious damage to the electrical equipment.

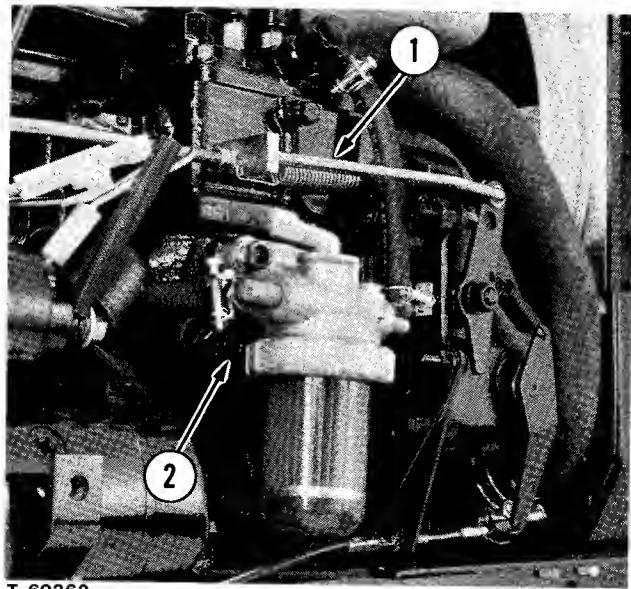
1. When installing a battery always make absolutely sure the ground polarity of the battery and the ground polarity of the alternator are the same. If a battery is of the wrong polarity, or if the battery is reversed when installing and connecting it into the charging system, the battery is directly shorted through the diodes. This will cause the diodes and wiring to be engangered by high current flow and burned out diodes and wiring harness will probably result.
2. When connecting a booster battery or auxiliary starting power as a starting aid, make certain to follow the same connection procedures as outlined in the CAUTION steps 1 thru 4 under BATTERY, Figure 13. Failure to observe this precaution will result in burned out diodes and wiring harness.
3. When connecting a battery charger to the batteries, connect the charger positive lead to the battery positive terminals and charger negative lead to the battery negative terminals. Failure to follow this procedure will result in damage to diodes and wiring harness. Never attempt to start engine or turn key switch to the "ON", "GLOW" or "START" position while charger is in use.



CAUTION: Never operate the alternator on an open circuit. With no electrical load in the circuit (wires removed or disconnected), the alternator can build up high voltages which can be extremely dangerous to any one who might accidentally touch the battery terminal on the alternator. Before making tests or checks, make sure all connections in the circuit are tight.

4. Do not short across or ground any terminals of the alternator or regulator. Grounding or shorting any of the alternator or regulator terminals can cause serious electrical malfunctions that may damage components of the electrical system.

5. Do not attempt to polarize the alternator. This is not necessary since the voltage developed within the alternator is of both polarities and the diode rectifier automatically controls the direction of current flow. It is important that the battery ground and the alternator ground be of the same polarity for diode protection.



T-69362

FIGURE 18 - R.H. View

1. Rack Cover

2. Oil Drain Plug

INJECTION PUMP LUBRICATION (Figure 18)

Injection pump is not lubricated by the crankcase nor does it depend on diesel fuel for lubrication. The pump holds 7 oz. (200 ml) of engine oil for lubrication. The injection pump oil should be changed every 200 hours.

DRAIN

Remove drain plug (2) and let oil drain out. Replace drain plug.

REFILL

To fill injection pump oil sump with oil, remove rack cover (1) and pour in 7 oz. (200 ml) of oil and replace rack cover. **NOTE:** If more than 7 oz. (200 ml) of oil is added it will drain off into crankcase.

ENGINE SERVICE TIPS

The following suggestions are listed for your assistance. You can make simple adjustments on your tractor that will improve its operation, and save you the time and expense of engaging a Serviceman.

HARD STARTING

Cold air temperatures
Insufficient fuel
Air traps
Loss of compression
Dirty nozzles
Battery charge low
Valve clearance incorrect
Fuel injection pump faulty
Fuel injection pump out of time

ENGINE OVERHEATING

Low coolant level in cooling system
Radiator clogged
Fan belt slipping
Collapsed radiator hose
Thermostat stuck
Engine overloaded
Diluted lubricating oil
Pulling heavy load at reduced RPM
Water pump impeller vanes broken
Radiator cap faulty

LOSS OF POWER

Insufficient fuel
Air in fuel line
Restriction in fuel line
Clogged fuel filters
Late injection pump timing
Loss of compression

Always make one adjustment at a time, and if the adjustment made does not improve the conditions, return to the original setting before proceeding to next adjustment.

Clogged air cleaner
Sticking valves
Valve clearance incorrect
Faulty nozzles
High idle RPM too slow

IRREGULAR OPERATION

Governor control linkage binding
Compression pressure uneven
Valves not seating properly
Faulty fuel nozzles
Low fuel pressure
Low operating temperature
Fuel injection pump out of time

EXCESSIVE EXHAUST SMOKE

Engine overloaded
Clogged air cleaner
Too much fuel to engine
Faulty fuel nozzles
Oil Consumption

ENGINE KNOCKING

Engine overloaded
Incorrect fuel
Incorrect timing
Engine RPM too slow

All adjustments on the fuel system must be made by a competent mechanic.

STORAGE OF TRACTOR**TRACTOR PROTECTION IS POCKET BOOK PROTECTION**

If the tractor is stored for any length of time, a few precautionary measures are helpful in preserving various parts, also in avoiding future difficulty.

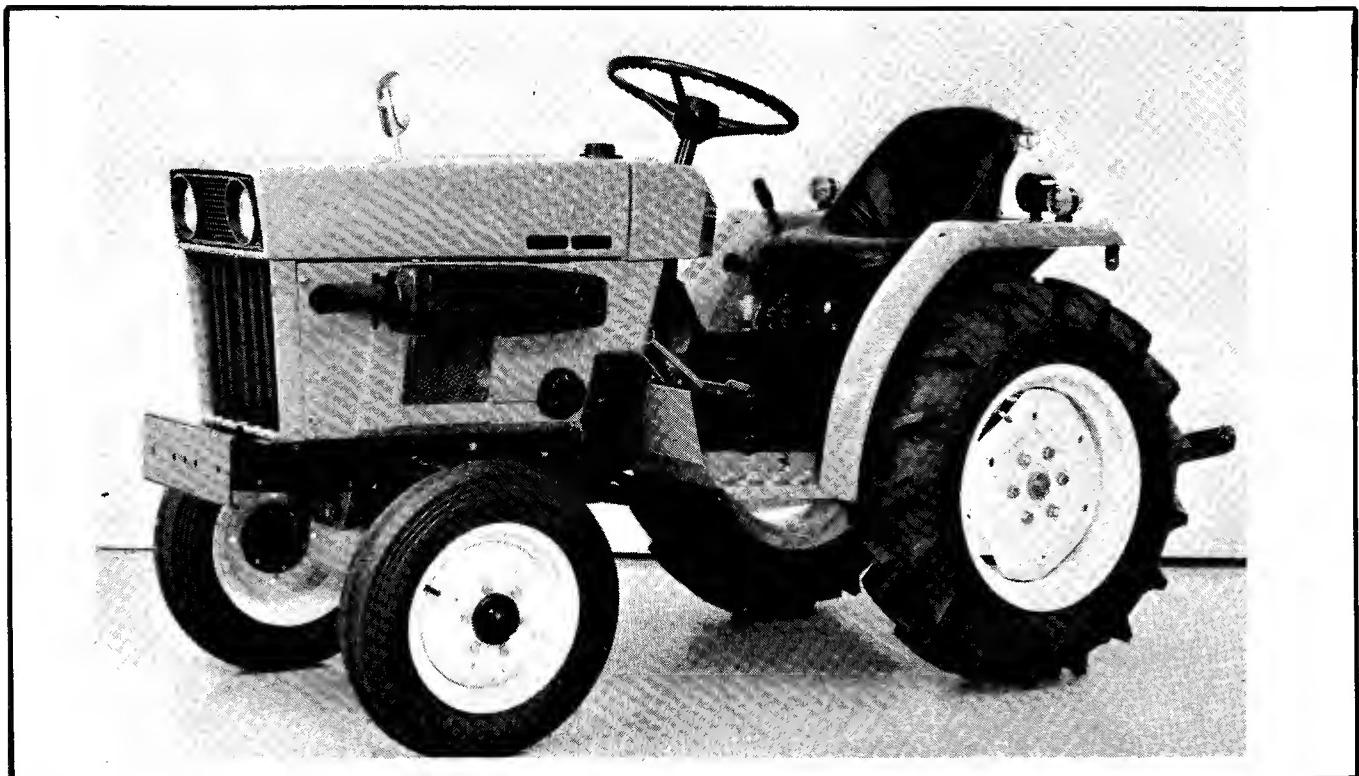
1. Store the tractor under cover. If it is impossible to place under cover, be sure to cover the exhaust pipe.
2. Leave the radiator cap and fuel cap slightly loose to protect the gaskets.
3. Block the tractor up to remove the weight from the tires and to keep the tires from contact with the moist floor.
4. Remove the battery and store it in a cool, dry place. Keep it fully charged.

5. Fill the fuel tank to the top to prevent condensation. The fuel should be treated with the proper amount of Diesel fuel conditioner to prevent formation of gum or wax. Run engine long enough to be sure all filters and injection equipment is filled with conditioned fuel.
6. Make sure radiator is filled with rust inhibited anti-freeze to the lowest expected temperature.
7. When tractor is removed from storage, it should be serviced throughout, including draining and refilling the engine oil sump with fresh clean oil.

NOTE: If this storage procedure is not followed, operate the tractor for one (1) hour at operating temperature once every three (3) weeks.

MEMO

Operating Controls And Instruments



T-69381

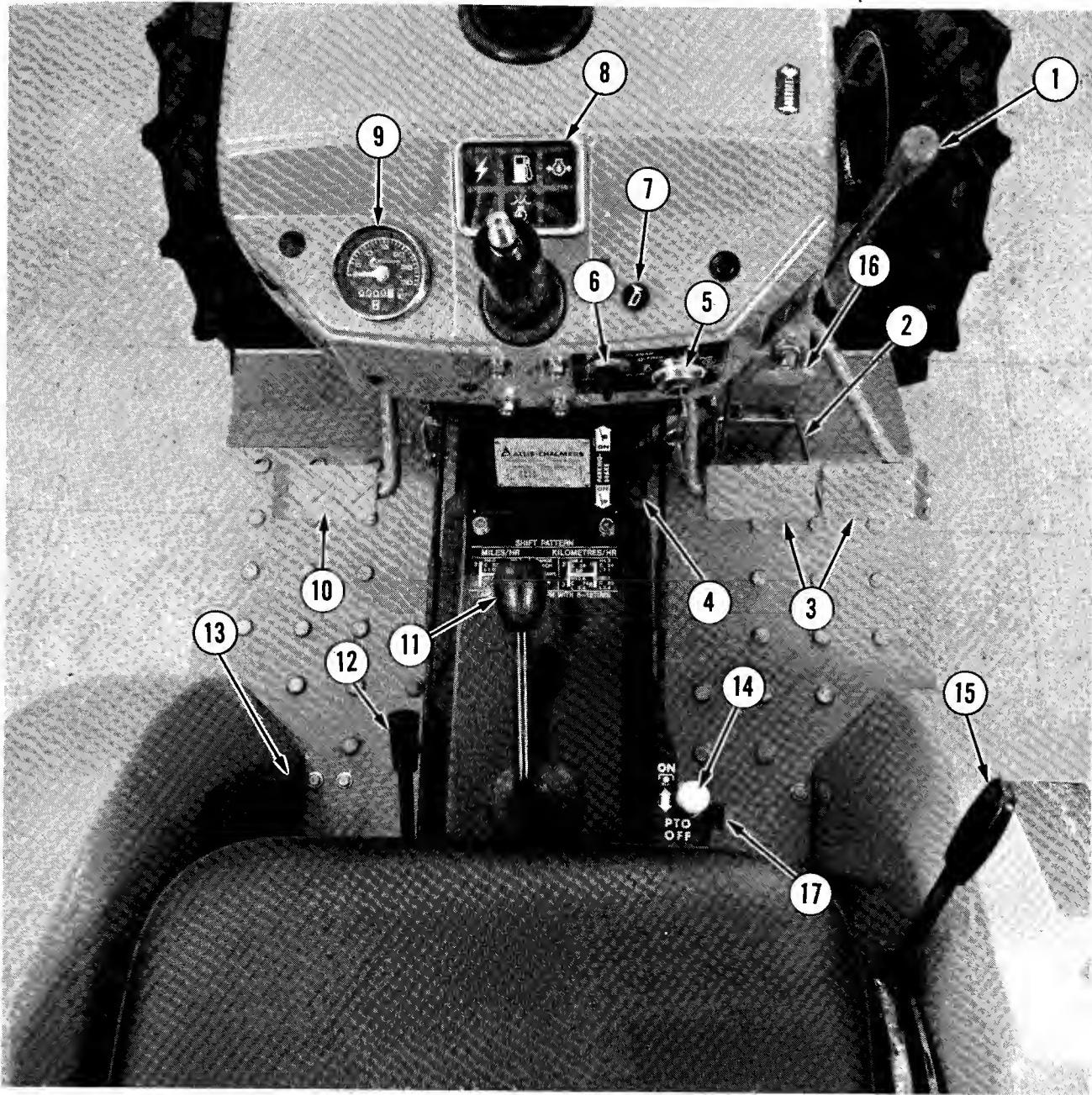
MAKE CERTAIN THAT THE DESIGNATED OPERATOR UNDERSTANDS the tractor's operating controls before attempting to operate.



CAUTION: Read, understand and follow the safety precautions, located throughout this manual.

Remember that safe operation is no accident.

OPERATING CONTROLS & INSTRUMENTS



T-69379

FIGURE 19 - Steering Wheel Removed for Clarity

- | | |
|------------------------|-----------------------------------|
| 1. Hand Throttle Lever | 9. Operation Meter |
| 2. Foot Throttle | 10. Clutch Pedal |
| 3. Brake Pedals | 11. Transmission Gear Shift Lever |
| 4. Brake Lock Lever | 12. Range Shift Lever |
| 5. Key Switch | 13. Front Drive Lever (for 4WD) |
| 6. Light Switch | 14. P.T.O. Shift Lever |
| 7. Horn Button | 15. Position Control Lever |
| 8. Legend Panel | 16. Fuel Shut-Off Control |
| | 17. Differential Lock Pedal |

INSTRUMENTS AND CONTROLS (Figure 19)

The operator of a tractor must familiarize himself with the various controls and instruments provided for its operation. Although many of these controls are similar to those of other tractors, there are important differences and it is not wise regardless of previous experience to operate tractor before fully understanding purpose and function of each control and instrument.

TEMPERATURE WARNING LIGHT (Figure 19)

This light will glow when engine coolant temperature is too hot to operate. If it glows while operating continue to run engine with no load and low idle to cool engine. Check radiator for trash.

ALTERNATOR WARNING LIGHT (Figure 19, Item 8)

The alternator warning light is located at top of legend panel. It will light whenever the alternator is not charging. The light will glow as soon as key is turned to run and should go out after engine starts. If it does not, stop engine and determine cause and correct.

ENGINE OIL PRESSURE WARNING LIGHT (Figure 19, Item 8)

This light is located in the upper R.H. corner of legend panel and will glow red when the engine oil pressure is below normal. If light comes on during engine operation, stop to determine cause and correct. It should glow when the key switch is turned to "RUN". It does not indicate the engine oil level. If light fails to glow when key switch is turned on, determine the cause and correct before starting engine. Check for burnt out light bulb or loose wires.

OPERATION METER (Figure 19, Item 9)

The operation meter is located on L.H. side of instrument panel. It records hours of engine operation and registers engine speed in RPM. It also has a mark to indicate standard P.T.O. speed. The operation meter runs only when the engine is running.

KEY SWITCH (Figure 19, Item 5)

The key switch controls the starting circuits and the instruments and gauges on the control panel. It must be in the "RUN" position to permit the starting circuits to operate and the warning lights to function. When key is turned to left to "OFF" it can be removed to prevent starting engine. The key switch must be "ON" to operate the tractor lights.

WARNING LIGHT CHECK (Figure 19, Item 8)

Each time the engine is started, be sure to check that all warning lights are functioning. When key switch is turned to "RUN" the alternator warning light and the

engine oil pressure warning light should come on. Then when the engine is started, these lights should go out.

If warning lights do not light under these conditions, check the cause and make the necessary repairs until they work correctly. DO NOT operate tractor with non-functioning warning and indicator lights.

FOOT THROTTLE (Figure 19, Item 2)

The foot throttle is located on R.H. platform. If throttle lever is set at less than full throttle, foot throttle can be used to increase engine speed for as long as desired, and then return it to the original setting. The foot throttle will not run engine any faster than speed obtained with throttle lever in full fast position.

LIGHT SWITCH (Figure 19, Item 6)

This switch has three positions:

No. 1 position (counterclockwise) is "OFF".

No. 2 position lights the front road lights, instrument panel light, red tail light and flashing warning lights.

No. 3 position lights the front road lights and instrument panel light.

Switch Position	Front Road Lights Instrument Panel Light	Red Tail Light Flashing Warning Lights
1	OFF	OFF
2	ON	ON
3	ON	OFF

ENGINE CLUTCH PEDAL (Figure 19, Item 10)

Depress engine clutch pedal while starting engine, shifting transmission into gear or changing from one gear to another, also to engage and disengage P.T.O. lever.

AVOID using engine clutch pedal as a foot rest.

BRAKE PEDALS (Figure 19, Item 3)

They may be operated individually to aid in turning or operated together when stopping the movement of tractor.

OPERATING CONTROLS & INSTRUMENTS

1. Flashing Warning Light
2. Red Tail Light
3. Red Reflector
4. S.M.V. Bracket



T-69366

FIGURE 20 - Rear View

HAND THROTTLE LEVER (Figure 19, Item 1)

Throttle lever to control engine speed is on right side of instrument panel. "DOWN" is slow idle speed, and "UP" is full engine speed. Throttle lever can be set at any position between "SLOW" and "FAST".

TRANSMISSION GEAR SHIFT LEVER (Figure 19, Item 11)

The transmission gear shift lever is used to select the forward travel speed to meet varying working conditions and to shift into reverse gear. The transmission has three forward speeds. When used in conjunction with the range shift lever the 3-speed transmission provides 9 forward speeds and three in reverse.

To shift the synchronized gears, depress clutch pedal and move shift lever to desired forward gear. Stop tractor motion to shift into reverse.

TRANSMISSION range shift lever (Figure 19, Item 12)

To shift the range shift gears it is necessary to depress engine clutch pedal and stop all tractor motion. For ease of shifting range lever the transmission shift lever should be in one of the transmission gear positions. There is no detented neutral in the range shift lever, therefore never leave the range lever positioned between range positions.

SLOW MOVING VEHICLE EMBLEM (Figure 20)



CAUTION: ALWAYS make sure that S.M.V. emblem is VISIBLE from rear when traveling on public roads.

DIFFERENTIAL LOCKPEDAL (Figure 19)

The differential lock pedal is located near the rear of R.H. platform. The differential lock pedal is used to lock differential so both rear wheels must travel at same speed. This feature is useful when rear wheel-traction is poor, such as in mud or snow.

The differential lock may be engaged by depressing pedal whenever desired as long as tractor is traveling in a straight line. The differential lock is disengaged by removing foot from differential lock pedal.



CAUTION: Use differential lock only when traveling in a straight line at low or moderate speeds. Always disengage it before starting a turn.

FRONT WHEEL DRIVE LEVER (Figure 19, Item 13)

This lever engages front wheels. Push lever down to engage and pull lever up to disengage. To shift lever fully disengage clutch pedal and wait for tractor and P.T.O. shaft to come to complete stop.

REFLECTORS (Figure 20)

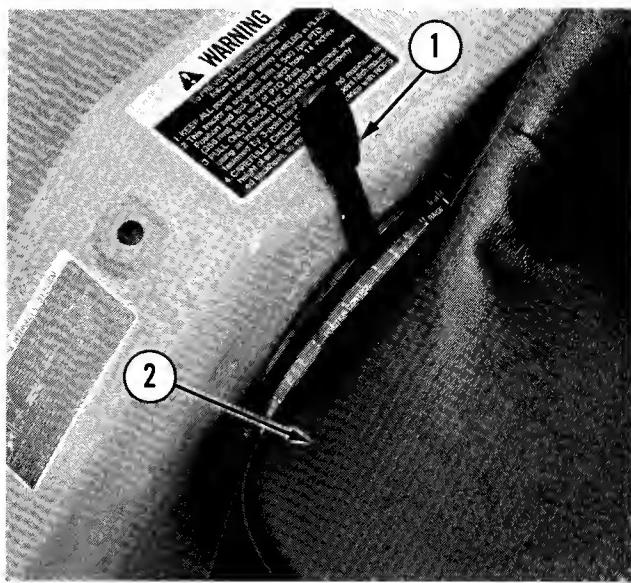
The rear of tractor wheel guards are equipped with two red reflectors. If these reflectors become damaged or destroyed, they should be replaced immediately.

FLASHING SAFETY WARNING LAMPS (Figure 20)

The warning lamps, which are located on top of wheel guards, are controlled by the light switch.



CAUTION: Use safety warning lights when operating tractor on public roads day or night unless prohibited by law.



T-65285

FIGURE 21

1. Position Control Lever 2. Seat

FUEL SHUT-OFF CONTROL (Figure 19, Item 16)

The fuel shut-off control is located to right of KEY SWITCH.

To stop engine, pull and turn to latch the control.

Before starting the engine, unlatch and push the control in. Never stop a hot engine. Allow engine to idle for a few minutes to gradually cool all parts evenly.

POSITION CONTROL LEVER (Figure 21)

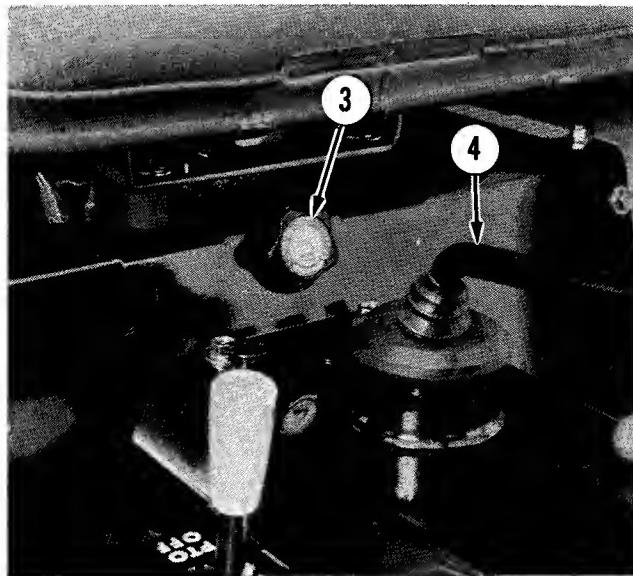
The single lever located on R.H. side of operator, controls the position control system. This lever controls tractor lift arms relative to tractor. This lever is used to control working depth of a tool bar not equipped with gauge wheels.

Select any lift arm height with position control lever to control working depth of implement.

The position of tractor lift arms is in direct relation with position of hand lever on quadrant. When hand lever is moved to rear of quadrant, lift arms will move to the top of their travel and stay there until hand lever is moved forward.

If hand lever is moved forward through half of its range, tractor lift arms will lower to half of their operating range. The lift arms will always raise when hand lever is moved rearward, and lower when hand lever is moved forward.

This lever must be in full rearward position while transporting implements to or from field, to assure that



T-69370

FIGURE 22

3. Rate of Lower Control 4. Gear Shift Lever

implement stays in full lift position.

RATE OF LOWER CONTROL (figure 24)

The rate of lower control knob is located on front end of the hydraulic cylinder under operator's seat.

This knob is used for controlling rate of lower of tractor lift arms.

Turning it clockwise decreases the rate of lower, while turning it counterclockwise increases the rate of lower.

When the knob is turned completely clockwise, lowering stops and the tractor lift arms cannot be lowered.

When locking the rate of lower valve operate as follows:

1. Set the tractor lift arms at the desired height by means of the position control lever.
2. Turn the rate of lower control knob completely clockwise (locking position).
3. Move the position control lever forward slightly. (At this time, the lift arms will move down slightly and stop.)



WARNING: When lowering of the implement could result in personal injury during maintenance, checking or cleaning of the implement, block implement in desired position with suitable supports.

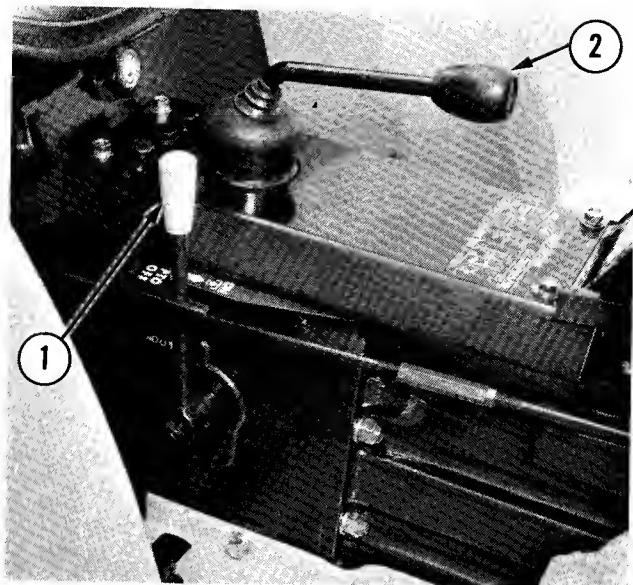
OPERATING CONTROLS & INSTRUMENTS

P.T.O. SHIFT LEVER (Figure 23)

The shift lever located on the R.H. side of the transmission controls the P.T.O. It has two positions - "ON" in forward position and "OFF" in rear position.

NOTE: The P.T.O. must only be engaged and disengaged while clutch pedal is completely depressed and tractor motion stopped.

If tractor engine is stopped while the P.T.O. lever is engaged, the P.T.O. lever must be moved to disengaged (rear) position before tractor engine can be started.



T-69371

FIGURE 23

1. P.T.O. Shift Lever 2. Gear Shift Lever

OPERATION



T-69381



**CAUTION: REMEMBER THAT SAFE
OPERATION IS NO ACCIDENT.**

After you have studied and learned the tractor controls read and study this section of manual before operating tractor. Be sure to follow Break-In Instructions.

OPERATION

STARTING AND STOPPING THE ENGINE

Before starting engine for first time each day, make certain that all points of lubrication and service have been performed as instructed in lubrication and service guide.

Make certain clutch pedal is depressed & P.T.O. shift lever is in "OFF" position to actuate safety, start switches.

Turn key switch to "GLOW" position and hold it until the GLOW LAMP glows. (Normally, it glows within 20 - 30 seconds, but it may take more than 30 seconds when ambient temperature is low.

Place throttle lever at mid speed position, and push fuel shut-off control in.

Turn key switch to "START" position to crank engine. When engine is warm, "GLOW" is not needed.



CAUTION: To prevent personal injury never attempt to start engine or operate tractor without being in operator's seat. Never start engine while standing on ground.

Be sure that the TRANSMISSION SHIFT LEVER is in neutral, PTO shift lever is in OFF position and engine clutch pedal is fully depressed.

NOTE: As key switch is turned ON, the red engine oil pressure indicator light should glow. If light fails to glow, determine and correct cause of failure. After engine starts, light should go out, indicating proper engine oil pressure.

If engine fails to start after a short cranking period of about 10 seconds, wait two minutes before cranking again. This is to prevent overheating of the starting motor. If after three attempts, the engine fails to start, determine cause and correct failure.

FAST WARM-UP PERIOD

Condensation accumulates in any engine during initial warm-up period or when operating at too low a temperature. To reduce condensation and undue engine wear, practice fast warm-up of engine temperature.

This warm-up period can be further reduced by operating engine at approximately 1000 RPM and slightly loading engine for first 5 to 10 minutes, such as driving to field. Never operate tractor under full load until engine has reached operating temperature.

Avoid unnecessary idling of engine, as this will cause engine operating temperature to fall below its normal operating range and cause rapid accumulation of engine sludge. Idling also causes engine oil dilution

due to incomplete fuel burning as well as forming deposits on valves and piston rings. It is best to stop engine if tractor is to be idling for a time.

BREAK-IN-PERIOD

The engine is assembled and tested at the factory to insure that it is ready for work; however, the engine must be properly broke in to obtain the peak performance and long life that is built into the engine. Proper break-in- will increase the power and prolong engine life.

To properly break-in an engine merely means that the engine should be operated at reduced loads for a period of time (approximately 100 hours) long enough for the piston rings to seat in with the cylinder walls and form a lapped fit which would make a perfect seal between pistons and cylinder walls before the engine is used on rated load operations.

If an engine is operated at full load before it is broken in, the high pressures and temperatures created from the burning gases tend to escape between the piston and cylinder wall into the engine crankcase, this is called blow-by

Blow-by tends to heat and collapse the piston rings which causes them to carbon up and stick to such extent that they will never seat to the cylinder walls. This causes the engine to have excessive oil consumption and a loss of power. In any event, the time required for proper break-in is well paid for in added fuel economy and top engine performance.

The original fill of oil should be used approximately for the first 20 hours of operation during the break-in period and then drained. Any foreign material which might accumulate in a new engine will be drained out. Change the engine oil filter at this time.

Refill the engine oil sump with oil as recommended in the "Lubrication and Service Guide". The oil used should have a service classification of CD (DS Series 3) oil for the diesel engines (See special Lubrication Information).

After the first 50 hours of operation, change the transmission and hydraulic oil and filter.

When breaking-in an engine, it is necessary to maintain the proper operating temperature 160° to 220° F (71° to 104° C) to avoid the accumulation of condensation. This practice should also be continued after the break-in period. Condensation will damage and deteriorate the vital parts of an engine to complete destruction if allowed to accumulate for a period of time.

As the break-in period progresses, approximately after first 50 hours of operation at reduced loads, load

should be increased at short intervals until at end of approximately 100 hours engine can be operated at rated loads. The load on engine can be decreased or increased by selecting a lower or higher transmission speed.

An engine should never be used on a load that would cause it to lug. This would be considered an overload. The throttle should be in full speed position on any load during or after the break-in period. Reducing engine speed on light loads may create a lugging condition. Reduced engine speeds may be used to limit travel speed if lugging is avoided.

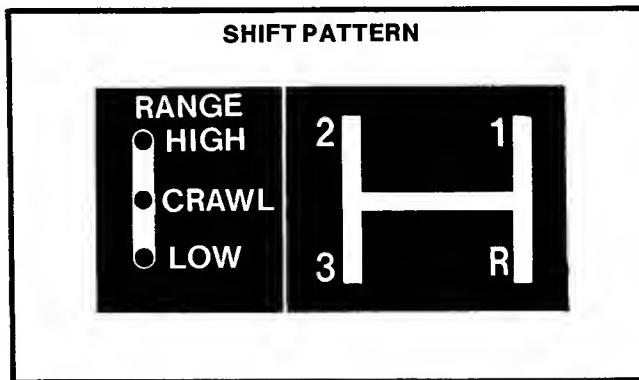
The balance of the tractor is also broken-in during this interval and proves beneficial to such parts as brakes, gears, bearings, etc. During this interval all external bolts should be checked for torque or tightness. All mating parts, gaskets, etc., take a set during this period and if all bolts are kept tight they will stay tight. If allowed to work loose for any length of time it will be impossible to keep them tight.

For proper break-in the following suggestions are made for best results;

1. Make certain that all points of care and lubrication outlined under "Lubrication and Service Guide" have been serviced as specified.
2. Maintain engine speed slightly above rated RPM by selecting a gear to match the load for the first 100 hours of operation.
3. Drain the engine break-in oil at the end of the first 20 hours of operation and refill with an oil of the recommended viscosity for the prevailing temperature. Change the engine oil filter also.

ENGINE CLUTCH PEDAL

The engine clutch pedal is located to the left and front of the operator.



Shift Pattern

This pedal is provided for engaging or disengaging power of engine from transmission and is used when shifting gears.

The clutch is adequate for many hours of normal use, but if abused or incorrectly used in any manner, its life can be drastically shortened. The clutch should never be slipped when starting loads and loads must be started at reduced engine speed. If clutch is used as a speed reducer, or for starting loads under full engine power, its life will be drastically shortened.

AVOID using engine clutch pedal as a foot rest.

GEAR SHIFTING — TRANSMISSION

The transmission has a shift lever to select the proper gear speed for the work being done. Before shifting into any gear, depress clutch pedal fully. Then move shift lever to the desired gear position.

To shift from one gear to another, shift directly to the neutral area, then move lever to desired position before shifting to the next gear. Never force lever from one gear to another.

There is no detented neutral in the range shift lever, therefore never leave the range lever positioned between the range symbols.

COASTING



CAUTION: Under no conditions should the tractor be towed at speeds over 8 MPH (13 km/h). Never exceed this speed.

If it becomes necessary to tow this tractor follow these instructions.

1. Place transmission shift lever in neutral position.
2. Place PTO shift lever in neutral position.
3. Place range shift lever in "HIGH".

TOWING TO START ENGINE

1. Place PTO shift lever in neutral position.
2. Place transmission shift lever in 3rd gear and range shift lever in "HIGH".
3. Start towing tractor and engage clutch.
4. Never exceed 8 MPH (13 km/h) while towing.

OPERATION

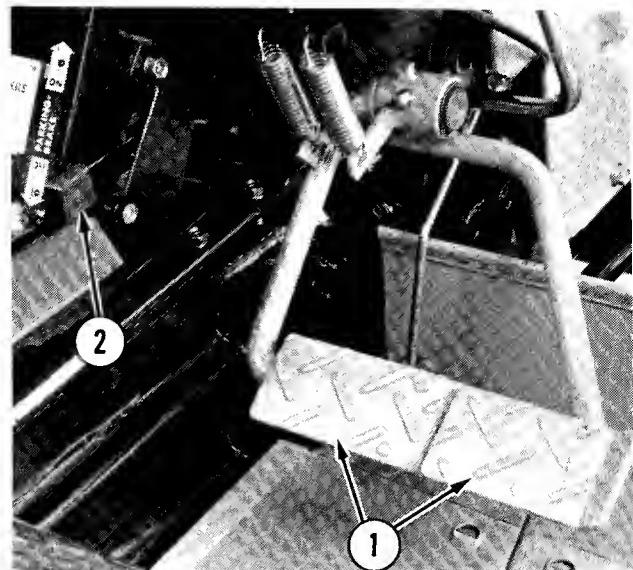
BRAKE PEDALS (Figure 24)

The brake pedals are conveniently located to right and front of operator. They may be operated individually to aid in turning, or operated together when stopping forward and rearward motion of tractor.

When stopping, apply pressure evenly to both pedals. The pedals may be latched together for driving on highway. To aid in turning during field use, apply brake for side to which tractor is being turned.



CAUTION: DO NOT attempt short turns at high speeds.



T-69372

FIGURE 24

1. Brake Pedals

2. Brake Lock Lever

BRAKE LOCK LEVER (Figure 24)

The brake lock lever is located to right of operator and is used when locking brake pedals in applied position. If it is desired to lock both brakes, brake pedals must be latched together, as lock is applied to one pedal only.

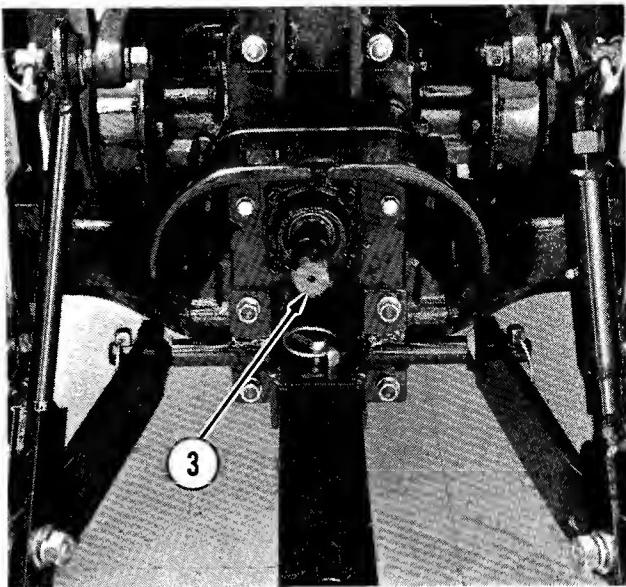
To lock brake pedals in applied position, move brake lock lever up and depress brake pedals. To release brakes, depress brake pedals. Be sure brakes are released before operating tractor.

P.T.O. SHAFT OPERATION (Figure 25)



CAUTION: Make sure P.T.O. shield is in place.

NOTE: It is recommended that top hitch point hole in upper link attaching bracket be used for upper link when operating fully mounted P.T.O. driven equipment. This will provide minimum change in drive line tilt when an implement is lifted and maximum clearance between upper link and the P.T.O. shield.



T-69374

FIGURE 25 - Rear View**3. P.T.O. Shaft****SAFETY TIPS & P.T.O. OPERATING INSTRUCTIONS**

1. When hitching to a 540 RPM power take-off implement, tractor drawbar must be positioned with hitch hole 14" (356 mm) horizontally to rear of end of P.T.O. shaft. Be sure that drawbar is positioned correctly.
2. Be sure tractor engine is stopped before attempting to attach implement P.T.O. front yoke to tractor P.T.O. shaft. With engine stopped and P.T.O. shift lever is in disengaged position shaft can be turned by hand to align with splines in yoke.

3. Refer to "P.T.O. Shift Lever" in "Operating Controls" section for instructions on how to engage P.T.O.
4. Read the implement Operator's Manual for any special instructions.
5. Select a low tractor gear to start operation. Move to faster gear as crop and ground conditions permit.
6. To obtain rated 540 RPM P.T.O. speed set engine speed to maintain pointer on operation meter on P.T.O. Mark (2365 RPM engine speed). For special conditions set P.T.O. at speeds recommended in implement Operator's Manual.
7. Select transmission gear and shift position to permit handling heaviest areas of crop without lug- ging engine below speed selected in Item 6. Then in lighter crop areas shift into a higher gear for increased efficiency, dropping back to lower gear as required in heavy crop areas.

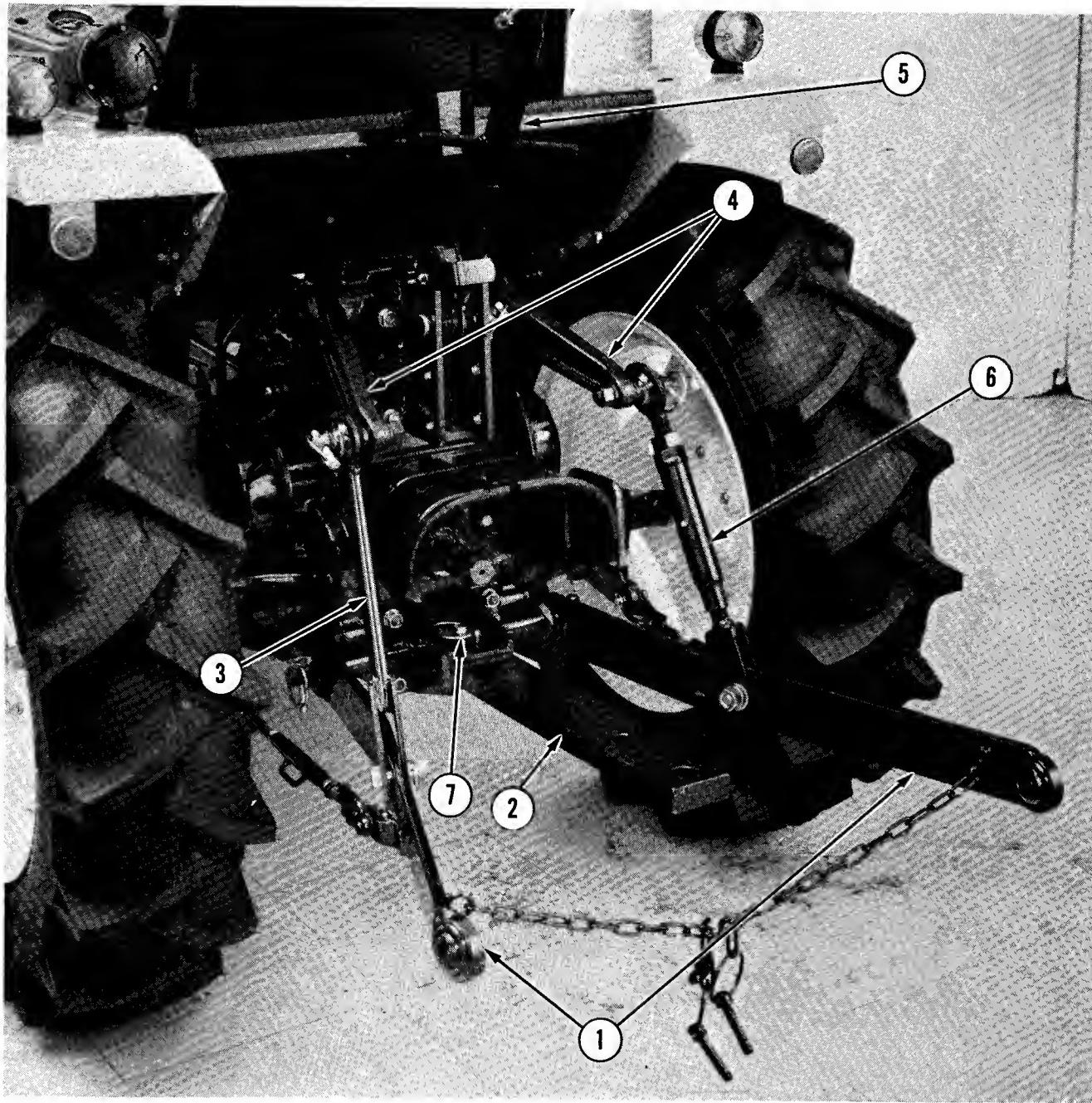


CAUTION: To prevent personal injury keep all shields on tractor and P.T.O. driven equipment in place at all times.



CAUTION: When a P.T.O. driven implement is attached to tractor, do not leave tractor operator's station unless the P.T.O. is disengaged, transmission shift lever in neutral, brakes are set and engine is stopped. **Exception:** For certain implements such as forage blower, feed grinder, forage harvester, knife sharpening, etc., which require P.T.O. operation while in stationary position without an operator on tractor, follow the specific instructions for operation as given in implement operator's manual.

OPERATION



T-69380

FIGURE 26 - 3-Point Hitch

1. Draft Arm
2. Drawbar

3. Fixed Lift Link
4. Lift Arms

5. Upper Link
6. Adjustable Link
7. Drawbar Pin

DRAWBAR – 3-POINT HITCH (Figure 26)

The drawbar can be used with the 540 RPM P.T.O., If a 14" dimension from the end of P.T.O. shaft to the drawbar hitch hole is maintained.

3-POINT HITCH (Figure 26)

Tractors are equipped with a 3-point hitch. The hitch is rugged and fully adjustable, designed to work with Category I implements.

LIFT LINKS (Figure 26)

The R.H. draft arm is connected to lift arm by a screw type linkage. This linkage is used as a winging adjustment for leveling attached implement in a crosswise direction and can be used for raising or lowering draft arm while hitching to an implement.

The R.H. lift link can be adjusted by turning tube section.

Link must be locked in place with locknut after adjustment is made.

UPPER LINK (Figure 26)

The upper link is adjustable in length and is used to level implement fore and aft when at its working depth. The link may also be adjusted to aid in hitching. To adjust link turn center tube section until desired length is obtained and tighten locknut. three holes are provided in bracket for attaching upper link to tractor, to compensate for various tower heights of implements. For most operating conditions it is desirable to use center hole in bracket.

HITCHING TO IMPLEMENT (Figure 26)

Before attempting to hitch tractor to a 3-point hitch type implement, remove drawbar.

To do so, remove pin from drawbar bail and slide drawbar rearward; reinstall pin.

Back tractor up to implement until pin holes in lower links are close to implement hitch pins. Raise or lower draft arms until they are nearly same height as implement hitch pin.



CAUTION: BEFORE leaving tractor seat ALWAYS PLACE TRANSMISSION SHIFT LEVER IN NEUTRAL, disengage P.T.O. set brakes, and stop engine unless specifically instructed in Operator's Manual of some machine or attachment to do otherwise.

Hitch L.H. draft arm to implement and insert hitch pin.

To hitch R.H. draft arm may require lengthening or shortening lift link.

Attach upper link to tower on implement. The link may be lengthened or shortened to facilitate hitching.

Placing upper link in lower hole of tractor bracket and shortening lift links prior to lifting implement from ground with hydraulic system, will provide the greatest transport clearance for mounted implements.

Placing upper link in upper hole of tractor bracket will give the hydraulic lift system maximum liftability when raising an implement.

The links may have to be readjusted in field. The R.H. lift link is for leveling implement in a crosswise direction and upper link is used to level implement in a fore and aft direction when at its working depth.

PLOWING

If plowing with one wheel in the furrow, add more weight to wheel on land than wheel in furrow, because weight is shifted to furrow wheel.

IMPORTANT: Do not "overweight" tractor. To do so can put excessive strain on tires, rear axles, gears, bearings, brakes and other components.

OPERATION

TIRE INFLATION

Improper inflation is a large contributor to tire failure. Under-inflation will cause damage to the cord body of the tire. The repeated excessive flexing of the sidewall area may eventually cause a series of breaks and separation in the cord fabric. Over-inflation should also be avoided.

Check tire pressures at least every two or three weeks. Special gauges are available for checking tires filled with calcium chloride solutions. Be sure to wash out the gauge with clear water after using on tires filled with calcium chloride.

To determine the true operating pressure for a liquid filled tire, the valve should be at the bottom of the tire.

Tire pressure should be checked when they are cold and before the tractor is put into operation, since the pressure in the tire rises somewhat as the tire gets warm. A tire that has enough pressure when it is hot may be under-inflated when it cools.

Generally speaking, tire inflation should be high enough in both rear tires to prevent them from wrinkling or buckling.

The following table lists the tire manufacturer's recommendation for the minimum and maximum pressures and corresponding maximum permissible total weight supported by each tire at speeds up to 20 MPH (32 km/h) maximum.

Inflate the tires to the minimum pressure shown in column 1 unless the total weight supported exceeds that in column 2. In that case increase the pressure as required but not to exceed the maximum pressure in column 3.

MOUNTING TIRES



WARNING: The proper and safe mounting of tractor tires, tube type and tubeless, requires special equipment and special procedures. To attempt to mount tires without this equipment can cause tire or rim rupture during inflation resulting in a dangerous explosive force sufficient to cause personal injury or death. For this reason, we recommend that tractor tire mounting be done only by your Tire Dealer or other qualified person equipped and trained to perform this service.

TIRE PRESSURE & LOAD TABLE								
Column	1		2		3		4	
TIRE SIZE	MINIMUM PRESSURE		TIRE LOAD RATING		MAXIMUM PRESSURE		TIRE LOAD RATING	
FRONT	PSI	kPa	Lb.	kg	PSI	kPa	Lb.	Kg
4.00-12 4 Ply	17	117	308	140	46	318	551	250
5 - 14 4 Ply	8	59	242	110	34	235	551	250
20.5 x8.00-15 4 Ply	11	78	606	275	23	156	904	410
REAR								
8 - 18 4 Ply	11	78	760	345	23	156	1146	520
29 x 12.00-15 4 ply	11	78	1290	585	20	137	1785	810

WEIGHTING THE TRACTOR

Conditions may exist where you will wish to add weight to the tractor to increase drawbar pulling power and decrease excessive wheel slippage. This additional weight can be in the form of calcium chloride solution in the tires, cast iron weight on wheels and front end weights. The amount you need will depend on your ground conditions and jobs you are performing.

As weight is added to the rear wheels, the increased draft force tends to take weight off the front wheels.



CAUTION: Make certain that tractor is always equipped with sufficient front end weight to maintain tractor stability and prevent loss of steering control.

It is recommended that you do not use more weight than is actually needed to provide reasonable traction. Total weight on each wheel should not exceed the recommended load ratings of the tire manufacturer as listed in column 4 of the "Tire Pressure and Load Table" for your Tractor Model. On tractors equipped with ROPS Frame added weight must be limited by the gross vehicle weight listed below.

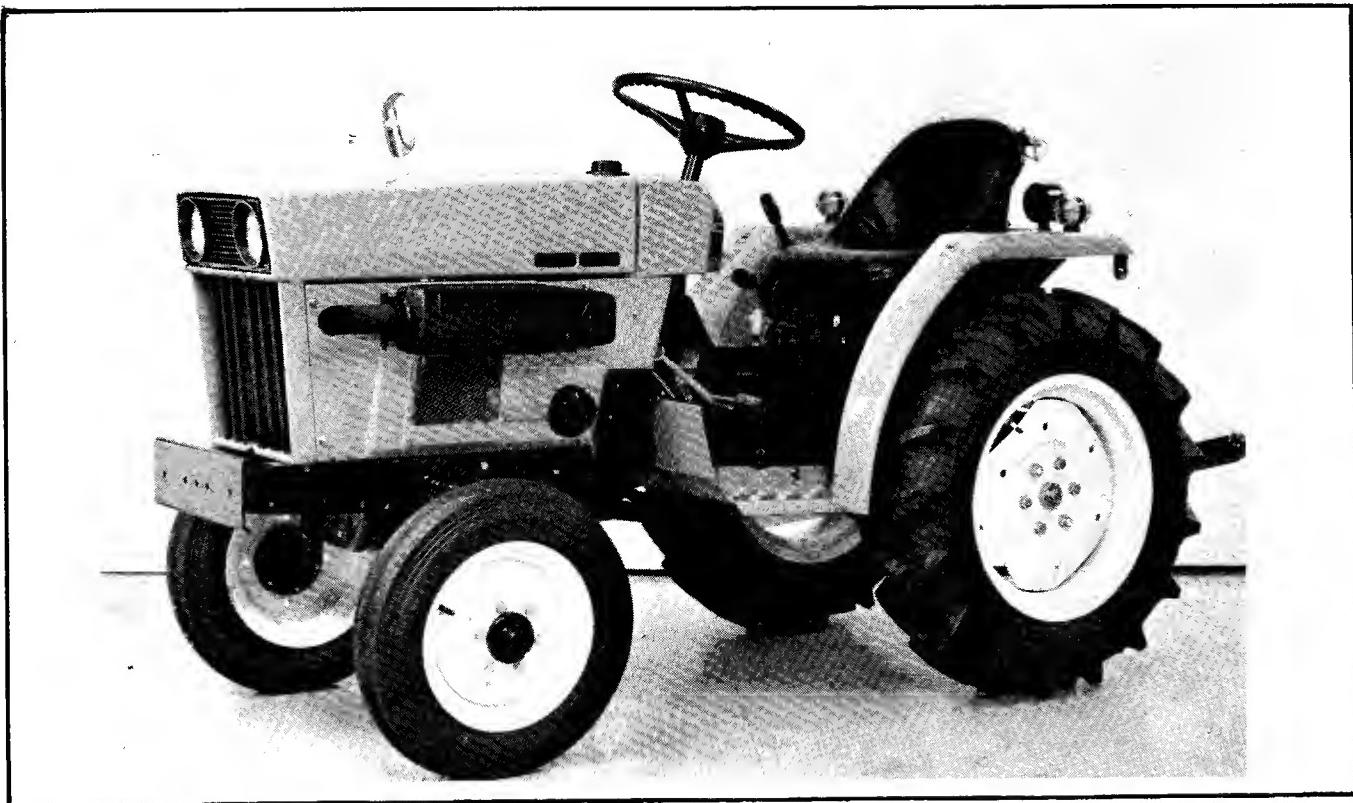


WARNING: The optional ROPS frame for this tractor is designed and manufactured to meet the requirements of OSHA standard part 1928, subpart C, for a gross vehicle weight of 2415 lbs. (1075 kg). Exceeding this weight can result in injury or death if roll-over should occur.

It is also suggested that the added weights be removed for the light draft jobs such as cultivating, planting, etc. Carrying unneeded weight will increase soil compaction, waste fuel and reduce life of tires, bearings, gears, etc.

MEMO

Adjustments



T-69381

ADJUSTMENTS

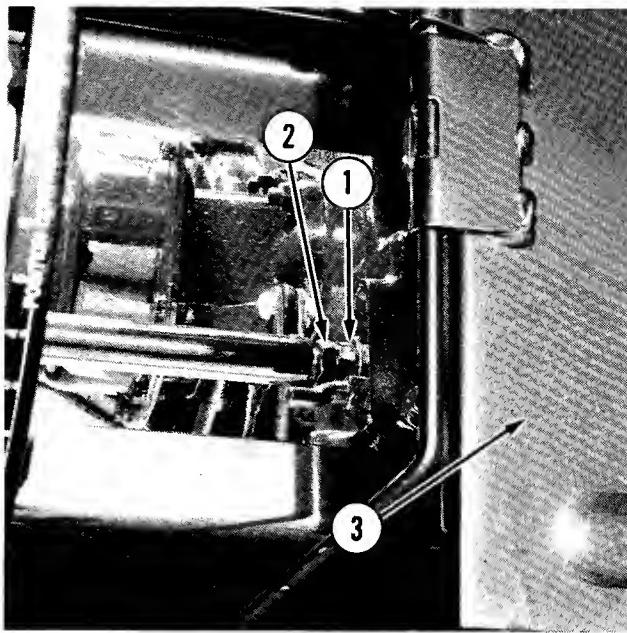
To keep your tractor operating properly it is necessary to make periodic adjustments.

Read this section of your Operator's Manual and refer to it when necessary.



CAUTION: To prevent personal injury never permit anyone to examine, clean, service, or adjust the tractor or any equipment operated by it UNTIL tractor engine is stopped, transmission shift lever is NEUTRAL, P.T.O. is disengaged, and all moving parts have stopped.

ADJUSTMENTS



T-69376

FIGURE 27 - Front R.H. View

1. Friction Adjusting Nut
2. Lock Nut
3. Seat Support

POSITION CONTROL LEVER FRICTION ADJUSTMENT (Figure 27)

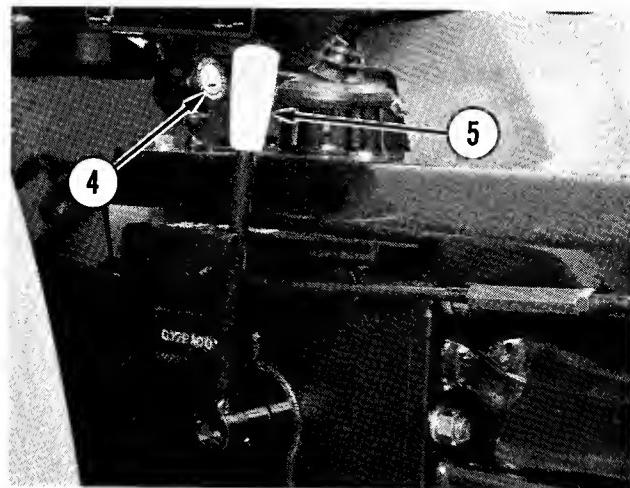
The position control lever friction should be tight enough to hold lever in position where placed. If lever moves without being touched, adjust as follows:

1. With engine stopped, loosen locknut and tighten friction adjusting nut slightly until lever does not move of its own accord.
2. Retighten locknut

RATE OF LOWER ADJUSTMENT (Figure 28)

This adjustment controls rate of lowering the lift arms.

1. Turning rate of lower control clockwise decreases lowering speed (indicated as slow) and turning it counterclockwise increases speed (indicated as fast).
2. When the control is turned clockwise to extreme, lowering stops and implement cannot be lowered (indicated as stop).
3. When locking, turn control clockwise to extreme and move position control lever to lower slightly. (At this time, implement will move down slightly and stop).
4. This control cannot adjust speed of raising. Raising speed is dependent on engine speed.



T-69365

FIGURE 28 - R.H. View

4. Rate of Lower Control
5. P.T.O. Shift Lever

P.T.O. SHIFT LEVER (Figure 28)

P.T.O. shift lever is located on R.H. side of transmission. It has two positions - "ON" in the forward position, and "OFF" in the rear position.

When shifting the lever to "ON" or "OFF", be sure clutch pedal is fully depressed and tractor motion is stopped.

If tractor engine is stopped while the P.T.O. lever is in the engaged position the P.T.O. lever must be moved to the disengaged position before tractor engine can be started.

P.T.O. SAFETY START SWITCH

This safety feature is designed into the P.T.O. shift linkage to prevent engine from being started while P.T.O. shift lever is engaged.



CAUTION: DO NOT BY-PASS the safety start switch. If it malfunctions, check with your authorized dealer and have it repaired.

NOTE: If tractor engine fails to start with P.T.O. shift lever in the disengaged position it may become necessary to adjust the safety switch bracket forward, the safety switch bracket is located to rear of P.T.O. shift lever on R.H. side of tractor transmission housing - Figure 28.

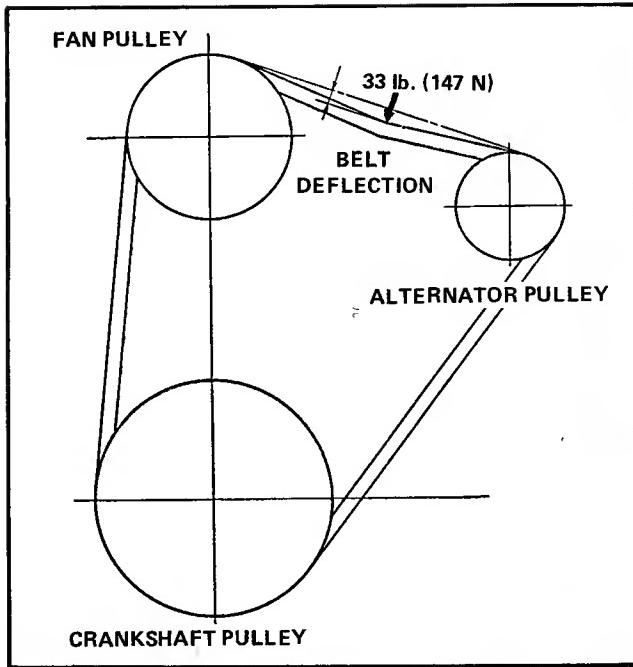
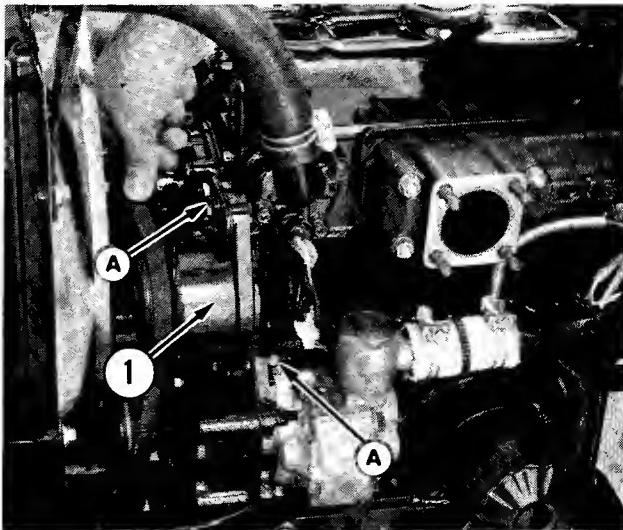


FIGURE 29



T-69361

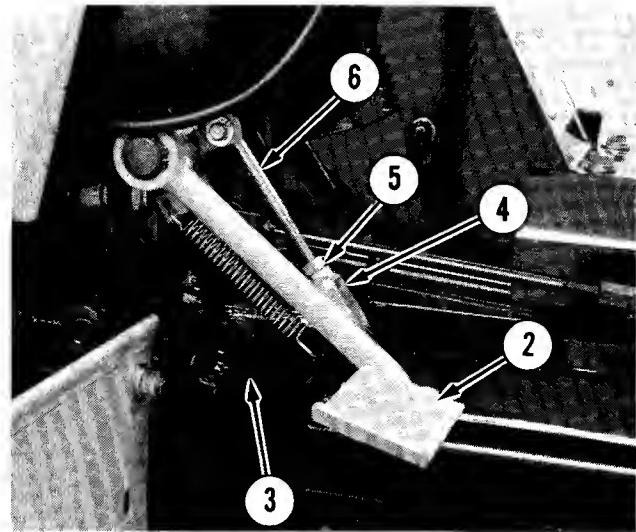
FIGURE 30 - L.H. View

A. Adjusting Bolts

1. Alternator

FAN BELT ADJUSTMENT (Figures 29 & 30)

The fan belt adjustment must be checked periodically and proper adjustment maintained at all times. If belt is allowed to become loose enough to slip on pulleys, it will greatly affect cooling system causing engine to run hot due to insufficient air flow and circulation of coolant. The fan belt must not be over-tightened as it will reduce life of alternator bearings, fan and pump shaft bearing and fan belt.



T-69378

FIGURE 31 - L.H. View

- | | |
|-----------------|---------------|
| 2. Clutch Pedal | 5. Lock Nut |
| 3. Clutch Lever | 6. Clutch Rod |
| 4. Yoke | |

Adjust fan belt to give .3 to .4" (8 to 10 mm) belt deflection midway between alternator and fan pulley. Belt deflection is obtained by a 33 lb. (147 N) force on a spring scale attached to belt.

To adjust fan belts, loosen capscrews on alternator brace and lower pivot point (A), move alternator toward or away from engine until above deflection is obtained and retighten capscrews. (Figure 30).

ENGINE CLUTCH PEDAL ADJUSTMENT (Figure 31)

The engine clutch pedal is initially adjusted to have .6" to .8" (15 to 20 mm) free travel at pedal pad. During operation this free travel will gradually diminish. The pedal free travel determines amount of clearance between clutch release bearing and clutch release levers.

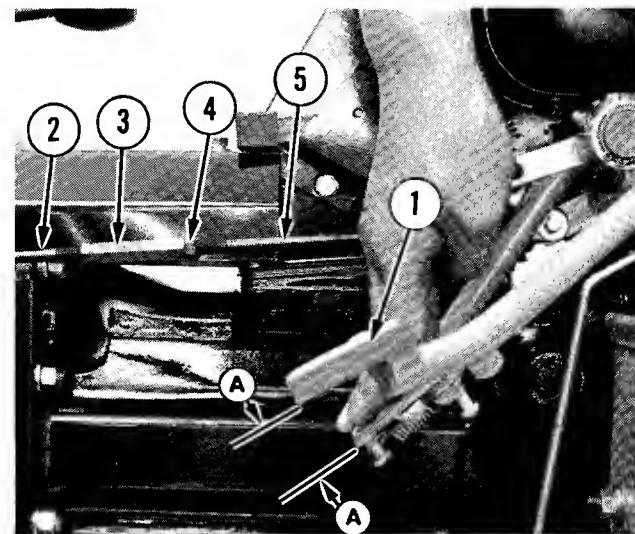
No pedal free travel will lead to clutch slippage or failure of clutch release bearing.

To adjust clutch pedal linkage, disconnect clutch rod from clutch lever and adjust yoke on rod until there is .6" to 8" (15 to 20 mm) of free travel at pedal pad, with rod attached to clutch lever and pedal against stop. When correct adjustment is obtained, attach rod to clutch lever with pin and insert and spread retaining cotter pin.

ADJUSTMENTS

ADJUSTMENT OF BRAKE PEDAL

1. Adjust right pedal first.
2. Loosen locknut and rotate turnbuckle so that pedal play is .8 to 1" (20 - 25 mm). Tighten locknut securely. (Pedal play is the distance the pedal moves freely when gently pushed by hand).
3. Adjust left pedal in the same way so that pedal play is equal.
4. Latch pedals together, engage brake lock lever and make sure that more than 2 notches remain on the ratchet.



T-69377

FIGURE 32

- | | |
|-------------------|-------------------------|
| 1. Brake Pedal | 4. Locknut |
| 2. Rear Brake Rod | 5. Front Brake Rod |
| 3. Turnbuckle | A. 8 to 1" (20 - 25 mm) |

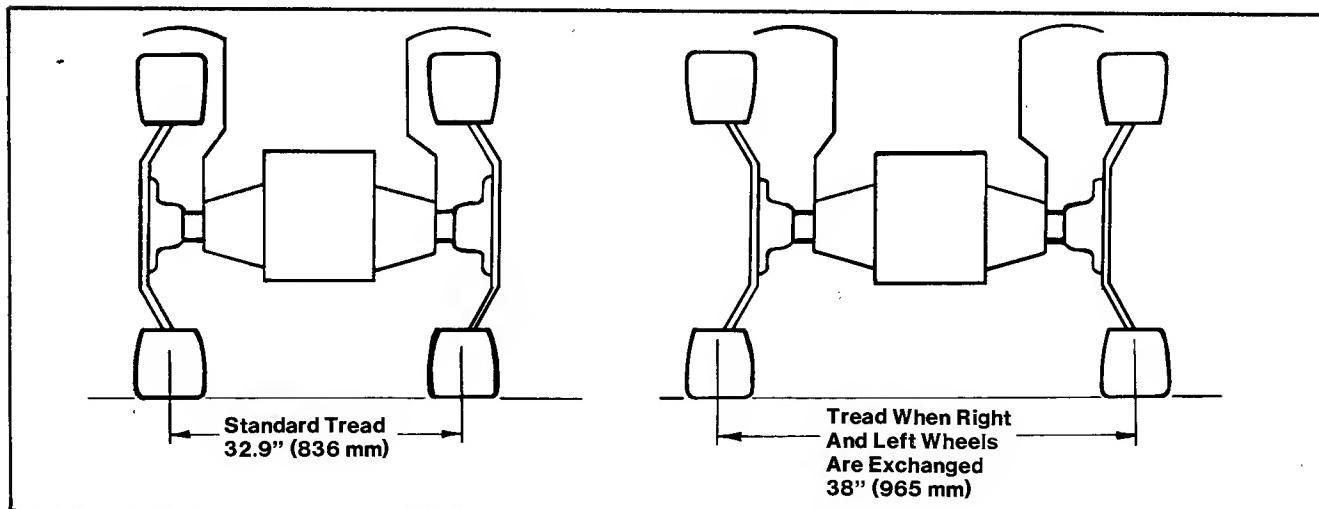


FIGURE 33 - Rear Wheel With 8 x 18 R1 Tires

FRONT WHEEL TREAD & TORQUE

The front axle with 4.00 x 12 F2 tires has a fixed tread of 31.7" (805 mm). The FWD front axle tread with 5 x 14 R1 tires is 33.9" (861 mm). When turf tires are used, front wheels have a single tread width of 35.2" (894 mm).

Torque front wheel bolts to 60 ft.-lbs. (81 N · m) on both 2WD and FWD units.

REAR WHEEL TREAD & TORQUE (Figure 33)

The rear wheel hubs cannot be shifted on axle. The rear wheel with 8 x 18 R1 tires and with wheels dished

inward as shown in L.H. side of Figure 33 is 32.9" (836 mm).

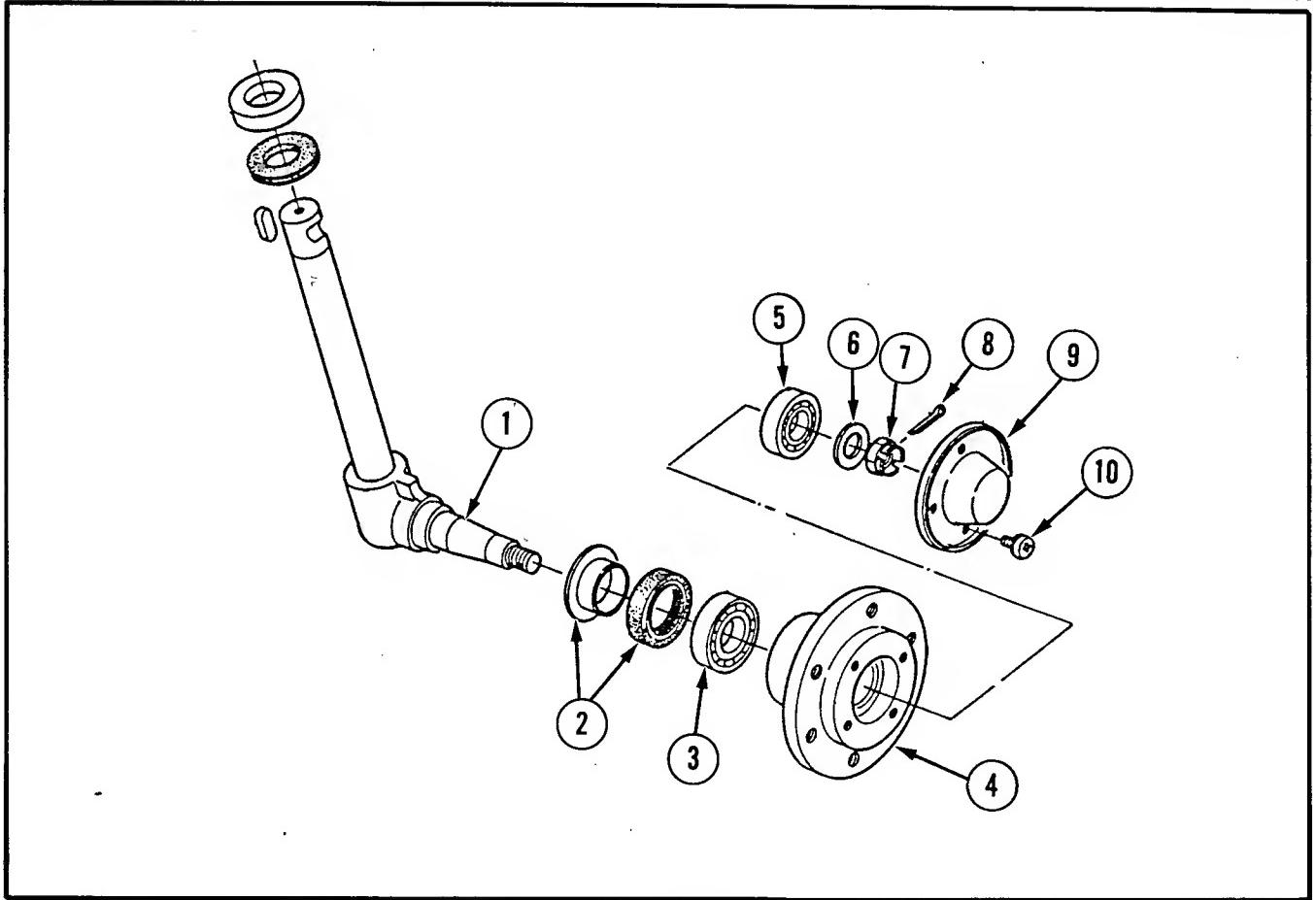
With wheels interchanged as shown on R.H. side of Figure 33, wheel tread is 38" (965 mm).

When rear turf tires are used they are installed on a single tread width of 36.5" (927 mm).

Torque rear wheel bolts and rear wheel hub lock bolts to 115 ft.-lbs. (156 N · m).



CAUTION: Never operate a tractor with loose wheel, rim or hub bolts.

**FIGURE 34 - Front Wheel Hub Assembly**

- 1. Spindle
- 2. Seal
- 3. Bearing
- 4. Hub
- 5. Bearing

- 6. Washer
- 7. Nut
- 8. Cotter Pin
- 9. Cap
- 10. Screw

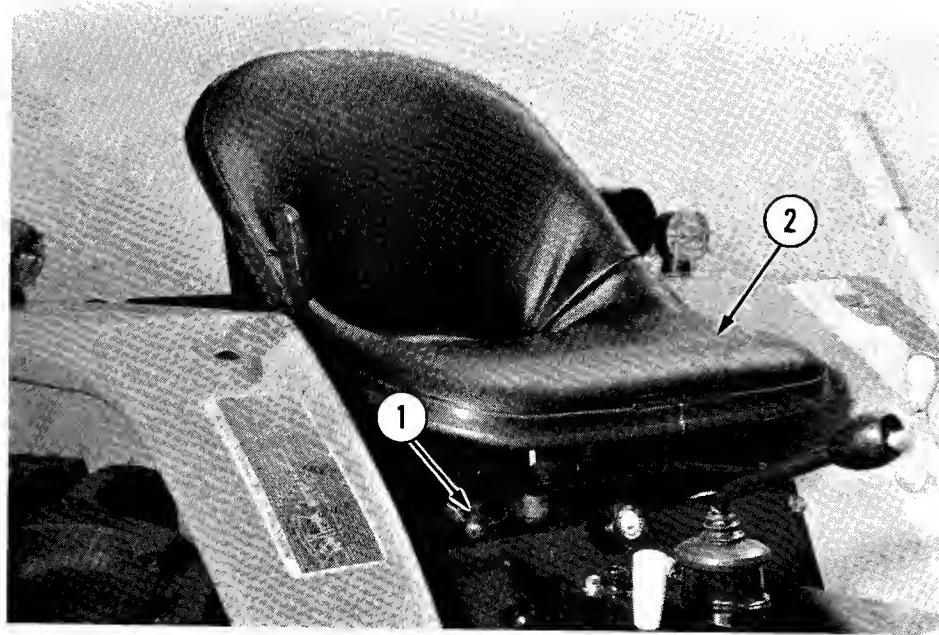
FRONT WHEEL BEARINGS (2 WD Only) (Figure 34)

Remove, clean and repack the front wheel bearings with No. 2 Wheel Bearing grease every 300 hours of operation or once a year. In extremely wet or muddy conditions service the bearings more often. Always replace the seals when repacking the bearings.

To adjust the wheel bearings proceed as follows:

1. Torque Castle Nut to a range of between 55 to 75 ft.-lbs. (75 to 102 N · m) and so that a cotter pin hole aligns for cotter pin installation.
2. Spread cotter pin to make sure that it cannot work out and also does not drag on hub cap.
3. Install hub cap using proper sealant.

ADJUSTMENTS



T-69373

FIGURE 35

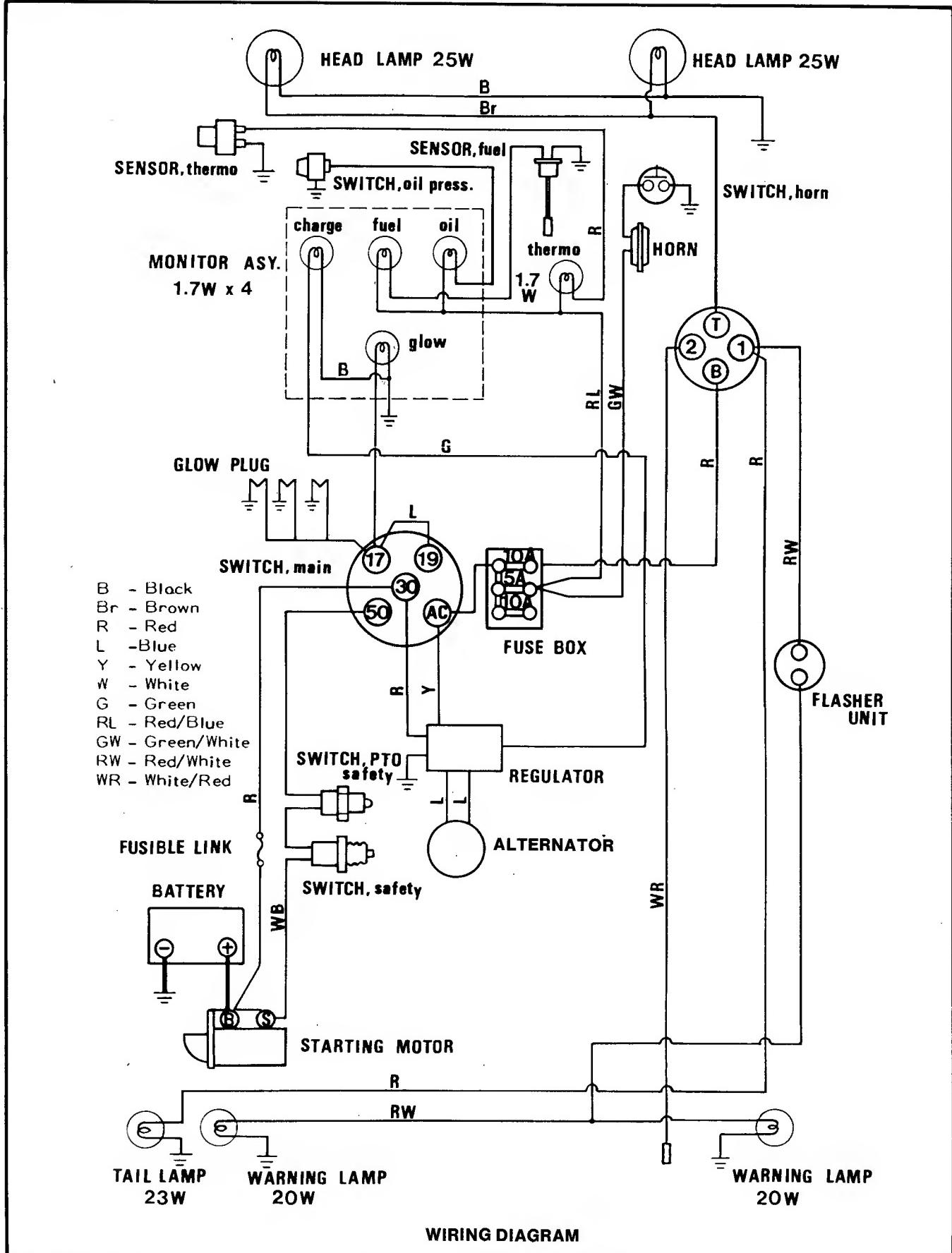
1. Adjusting Lever

2. Seat

SEAT ADJUSTMENT (Figure 35)

With use of adjusting lever the seat can be moved fore and aft to suit operator comfort.

WIRING DIAGRAM



WIRING DIAGRAM

MEMO

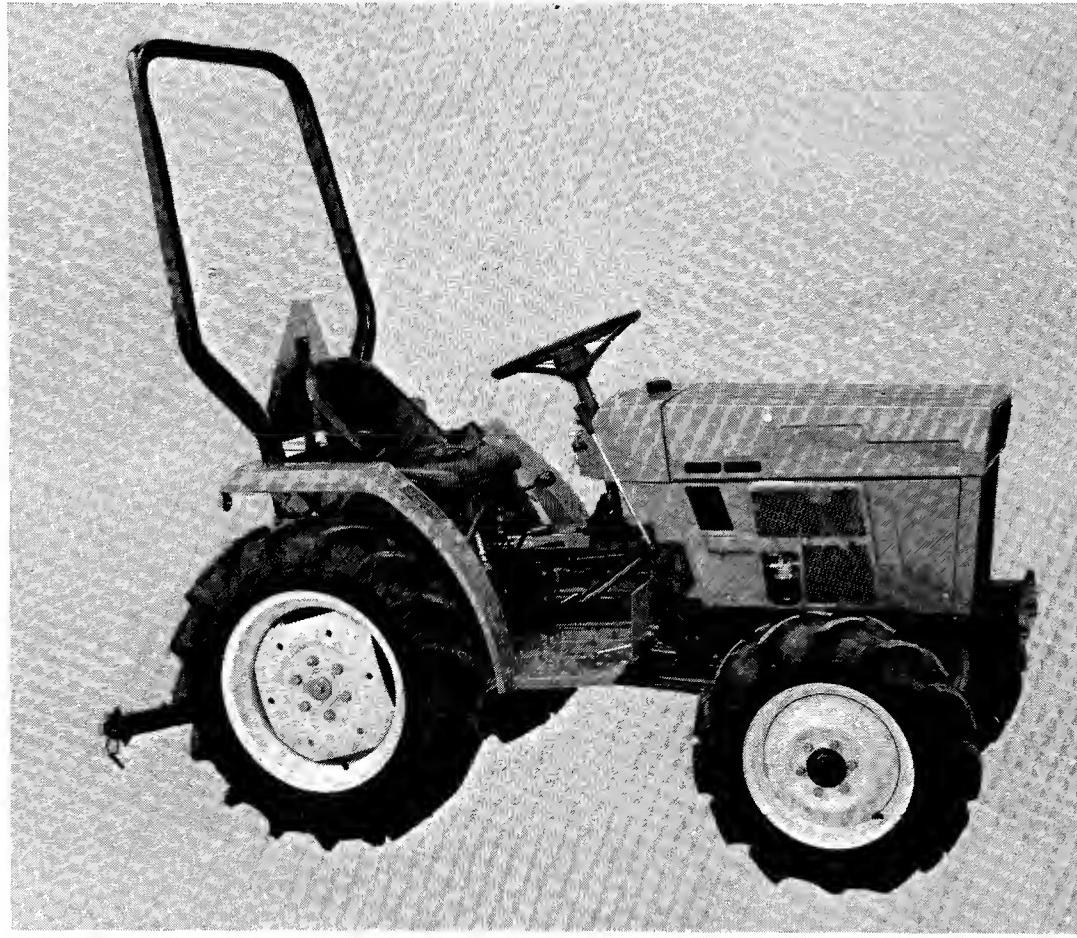
Miscellaneous, Optional, and Extra Equipment



WARNING: A tractor roll-over can result in personal injury or death. For your protection use of roll-over protective structure and seat belt is recommended.



CAUTION: To prevent personal injury never permit anyone to examine, clean, service, or adjust the tractor or any equipment operated by it UNTIL tractor engine is stopped brakes are set, transmission shift lever is neutral, P.T.O. is disengaged, and all moving parts have stopped.



T-69039

FIGURE 1 - Optional Protective Frame

1. Protective Frame

REINSTALLATION OF ROPS PROTECTIVE FRAME



CAUTION: The protective frame for this tractor (Figure 1) has been designed and manufactured to meet ROPS (Roll Over Protective Structures) requirements. ROPS for this tractor was tested and met requirements of OSHA, Standard Part 1928, Subpart C for a gross vehicle weight of 2415 lbs. (1095 kg).

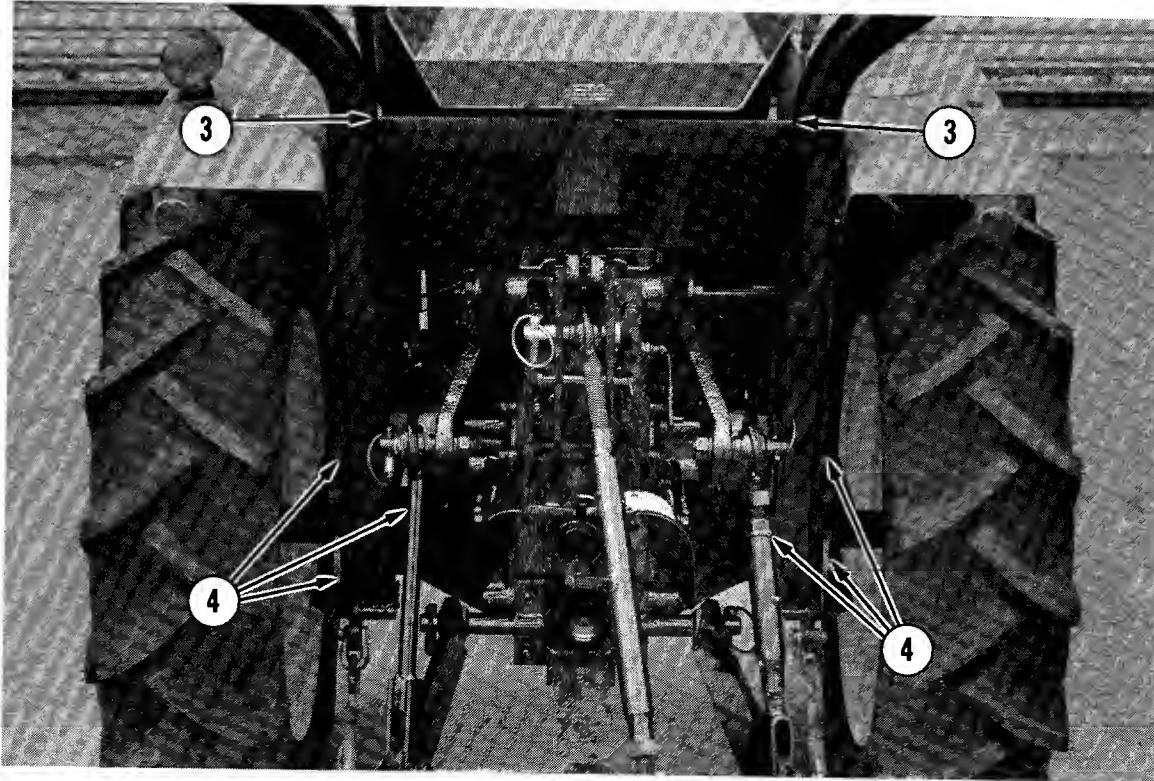
Any modification of these structures or changes in the mounting or mounting hardware or increase in gross vehicle weight will nullify compliance with these requirements.

In the event that the protective frame structure becomes damaged, the damaged parts or assemblies should be replaced rather than repaired to assure continued roll over protection. Do not substitute capscrews of any other size or grade in case the original ones become lost or damaged. Use only capscrews of the size and grade specified and tightened to the torque values given in this text. See your authorized dealer for available parts and assemblies.



CAUTION: ALWAYS use the seat belt with the protective frame. Replace the belt promptly if it should become frayed or damaged.

DO NOT use seat belt if tractor is not equipped with a protective frame.

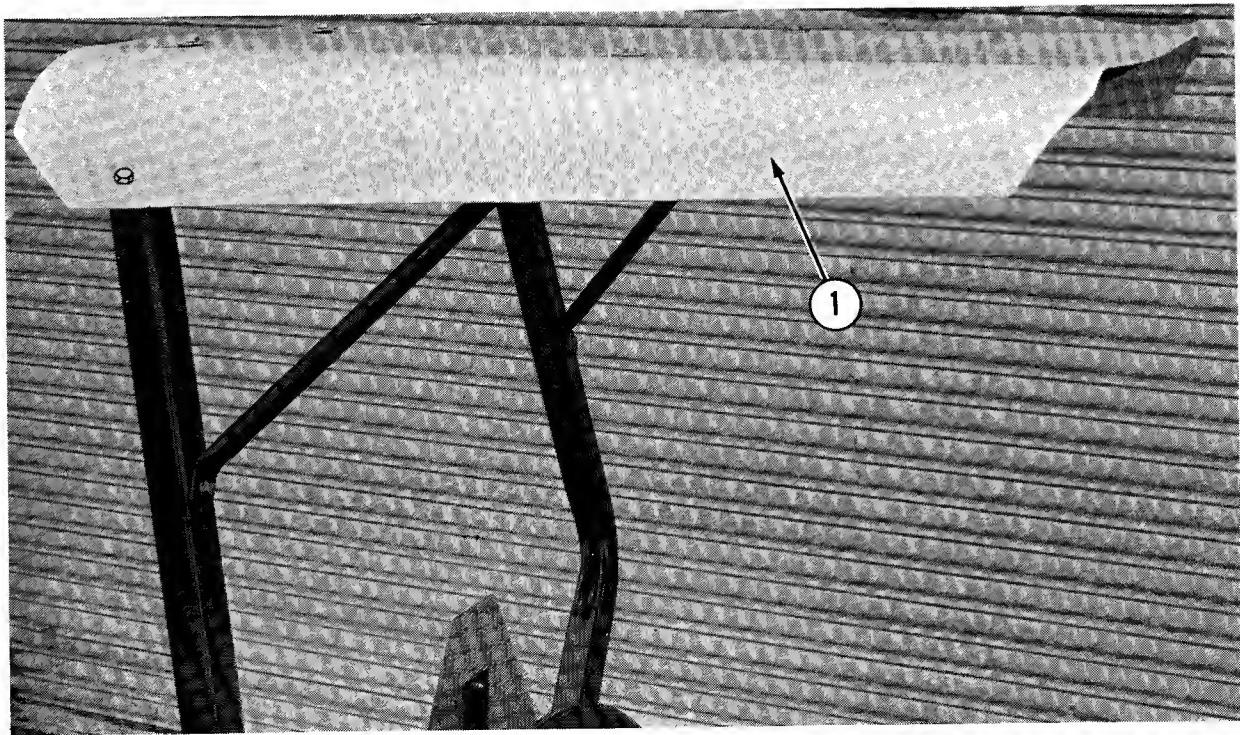


T-69038

FIGURE 2**3. Protective Frame****4. Long Bolts****INSTALLATION INSTRUCTIONS**

Raise protective frame (3) high enough to slide lower portion over axle housing of tractor. Install four long bolts (4) per side, clamping frame to axle housing. Torque $1\frac{1}{2} \times 6\frac{1}{2}$ " Grade 5 bolts to 65 ft.-lbs. (88 N · m). Attach sway chains to anchors located on protective frame.

MISCELLANEOUS, OPTIONAL, AND EXTRA EQUIPMENT



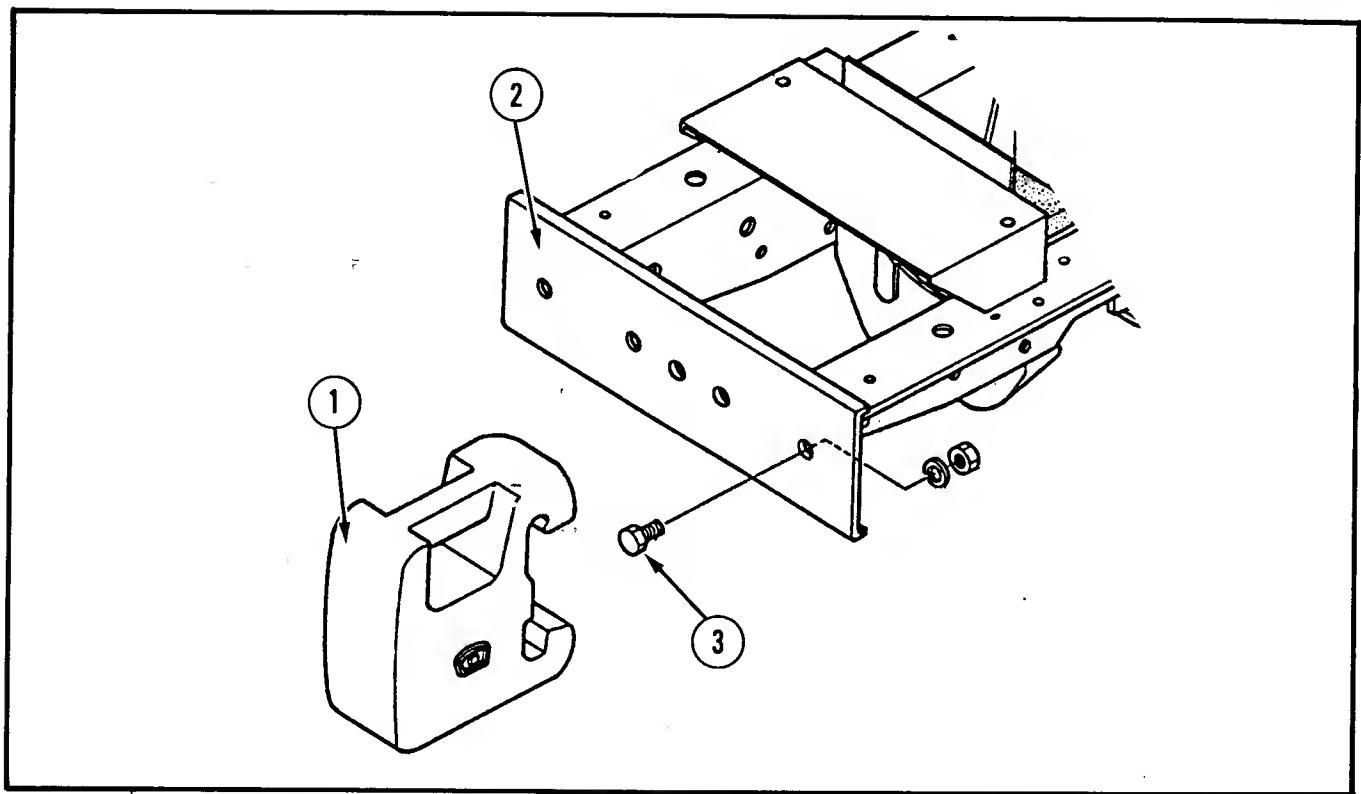
T-69041

FIGURE 3

1. Canopy

CANOPY FOR PROTECTIVE FRAME (Figure 3)

A canopy that covers the area over the operators station, is available as optional equipment for tractors equipped with protective frame. The canopy can be obtained from your authorized dealer.

**FIGURE 4 - Front Weights****1. Front Weight****2. Weight Carrier****3. Lock Bolt****FRONT WEIGHT (Figure 4)**

To mount the weight, remove lock bolt and slide weight over weight carrier and replace lock bolt.

MISCELLANEOUS, OPTIONAL, AND EXTRA EQUIPMENT

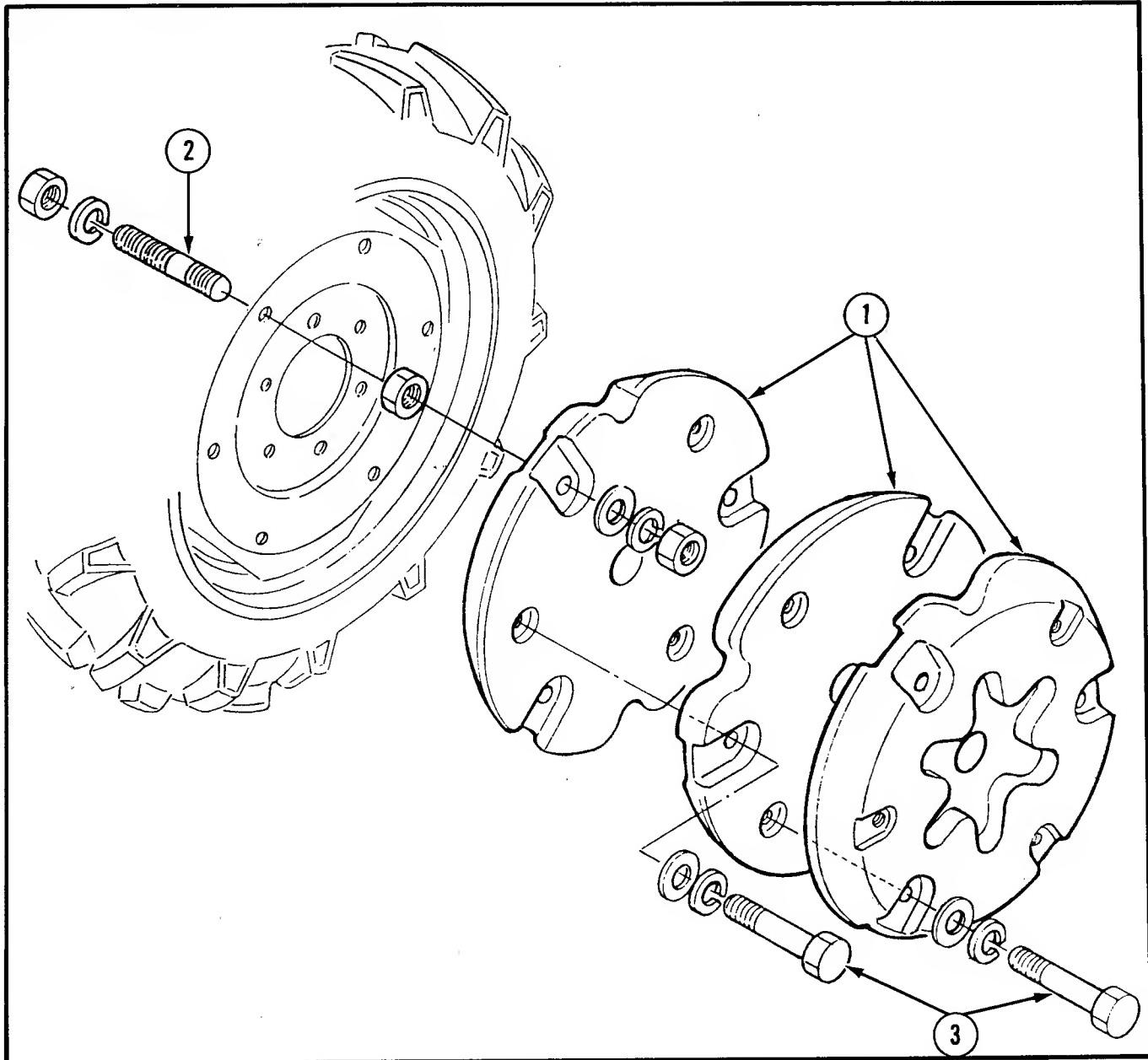


FIGURE 5 - Rear Wheel Weights

1. Rear Wheel Weights

2. Attaching Stud

3. Capscrews

REAR WHEEL WEIGHTS (Figure 5)

To mount rear wheel weights install attaching stud through wheel with a nut on each side of wheel and install first wheel weight. If additional weights are to be added, attach to next weight with capscrews.

OTHER OPTIONAL EQUIPMENT

Electric Engine Coolant Heater
Remote Valve
Hydraulic Manifold

IMPLEMENTS

Center Mounted Mower (48")
Snow Thrower (52")
Front End Loader w/48" Bucket
Front Dozer Blade (60")
Rear Mounted Mower (60")

METRIC INFORMATION

METRIC INFORMATION

In this manual measurements in U.S. customary units are followed by the metric equivalent in parentheses. For example: 5 inches (127 mm), 10 bushels (0.3524 m³) and 100 horsepower (74.6 kW).

These metric equivalents are provided for your convenience as an aid in converting to the metric system. A chart showing metric terms, examples, and abbreviations used in this manual is provided below.

METRIC/U.S.CUSTOMARY UNIT EQUIVALENTS

	Multiply:	by:	to get:	Multiply:	by:	to get:								
LINEAR	inches	x 25.4	= millimetres (mm)	x 0.03937	= inches									
	feet	x 0.3048	= metres (m)	x 1.0936	= feet									
	yards	x 0.9144	= metres (m)	x 1.0936	= yards									
	miles	x 1.6093	= kilometres (km)	x 0.6214	= miles									
	inches	x 2.54	= centimetres (cm)	x 0.3937	= inches									
	microinches	x 0.0254	= micrometres (um)	x 39.37	= microinches									
AREA	inches ²	x 645.16	= millimetres ² (mm ²)	x 0.00155	= inches ²									
	inches ²	x 6.4516	= centimetres ² (cm ²)	x 0.155	= inches ²									
	feet ²	x 0.0929	= metres ² (m ²)	x 10.764	= feet ²									
	yards ²	x 0.8361	= metres ² (m ²)	x 1.196	= yards ²									
	acres	x 0.4047	= hectometres ² (hm ²)	x 2.471	= acres									
			hectares (ha)											
VOLUME	inches ³	x 16387	= millimetres ³ (mm ³)	x 0.000061	= inches ³									
	inches ³	x 16.387	= centimetres ³ (cm ³)	x 0.06102	= inches ³									
	inches ³	x 0.01639	= litres	x 61.024	= inches ³									
	quarts	x 0.94635	= litres	x 1.0567	= quarts									
	gallons	x 3.7854	= litres	x 0.2642	= gallons									
	feet ³	x 28.317	= litres	x 0.03531	= feet ³									
	feet ³	x 0.02832	= metres ³ (m ³)	x 35.315	= feet ³									
	fluid oz.	x 29.57	= millilitres (ml)	x 0.03381	= fluid oz.									
	yards ³	x 0.7646	= metres ³ (m ³)	x 1.3080	= yards ³									
	teaspoons	x 4.929	= millilitres (ml)	x 0.2029	= teaspoons									
	cups	x 0.2366	= litres	x 4.227	= cups									
	bushel	x 35.239	= litres	x 0.02838	= bushels									
	bushel	x 0.03524	= metres ³ (m ³)	x 28.378	= bushels									
MASS	ounces (av)	x 28.35	= grams (g)	x 0.03527	= ounces (av)									
	pounds (av)	x 0.4536	= kilograms (kg)	x 2.2046	= pounds (av)									
	tons (2000 lbs.)	x 907.18	= kilograms (kg)	x 0.001102	= tons (2000 lbs.)									
	tons (2000 lbs.)	x 0.90718	= metric tons (t)	x 1.1023	= tons (2000 lbs.)									
	tons (long) (2240 lbs.)	x 1016.05	= kilograms (kg)	x .000984	= tons (long) (2240 lbs.)									
FORCE	ounces - f (av)	x 0.278	= newtons (N)	x 3.597	= ounces - f (av)									
	pounds - f (av)	x 4.488	= newtons (N)	x 0.2248	= pounds - f (av)									
	kilograms - f	x 9.807	= newtons (N)	x 0.10197	= kilograms - f									
PRESSURE OR STRESS	pounds/sq. in.	x 6.895	= kilopascals (kPa)	x 0.145	= pounds/sq. in.									
POWER	horsepower	x 0.746	= kilowatts (kW)	x 1.34	= horsepower									
	ft-lbf/min.	x 0.0226	= watts (W)	x 44.25	= ft-lbf/min.									
TORQUE	pound-inches	x 0.11298	= newton-metres (N·m)	x 8.851	= pound-inches									
	pound-feet	x 1.3558	= newton-metres (N·m)	x 0.7376	= pound-feet									
VELOCITY	miles/hour	x 1.6093	= kilometres/hour (km/h)	x 0.6214	= miles/hour									
	feet/sec.	x 0.3048	= metres/sec. (m/s)	x 3.281	= feet/sec.									
	kilometres/hr.	x 0.27778	= metres/sec. (m/s)	x 3.600	= kilometres/hr.									
	miles/hour	x 0.4470	= metres/sec. (m/s)	x 2.237	= miles/hour									
TEMPERATURE	TEMPERATURE													
	°F	-40	0	32	80	98.6	120	160	200	240	280	320	°F	
	°C	-40	-20	0	20	40	60	80	100	120	140	160	180	°C
	°Celsius = 0.556 (°F - 32)						°Fahrenheit = (1.8° C) + 32							

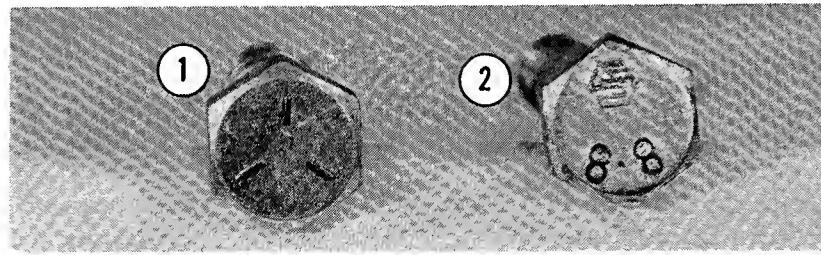
METRIC COMPONENT INFORMATION

In line with the Worldwide trend to Metrification, we are participating in this new Technology, which will improve your capabilities through additional standardization.

The following Charts provide helpful information for Identifying Torque Ratings.



CAUTION: This machine may contain some parts dimensioned in the Metric System as well as in the U.S. Inch System. Some fasteners are metric and are very close in dimensions to familiar fasteners in the U.S. Inch System. It is important to note that, during any repair or maintenance procedures, replacement fasteners must have the same measurements and strength as those removed, whether metric or U.S. Inch System. (Numbers on the heads of metric bolts and on surfaces of metric nuts indicate their strength. U.S. Inch System bolts use radial lines for this purpose, while most U.S. Inch System nuts do not have strength markings.) Mismatched or incorrect fasteners can result in damage or malfunction, or possibly personal injury. Therefore, fasteners removed from the machine should be saved for reuse in the same locations. Where the fasteners are not satisfactory for reuse, care should be taken to select a replacement that matches the original.



T-67598

FIGURE 1

1. U.S. Inch

2. Metric

CAPSCREW IDENTIFICATION

Customary Screws		Metric Screws	
SAE Grade	Head Marking	Properly Class	Head Marking
1	None	4.6	4.6
2	None	5.8	5.8
5	3 Radial Lines	8.8	8.8
8	6 Radial Lines	10.9	10.9

See Figure 1

The above markings are the most common although others may be encountered.

Customary screw threads are designated by diameter in inches and the pitch in threads per inch.

Examples:

1/2-13 means 1/2 inch diameter, 13 threads per inch (coarse thread).

1/2-20 means 1/2 inch diameter, 20 threads per inch (fine thread).

Metric screw threads are designated by diameter in millimetres and thread pitch in millimetres between threads.

Examples:

12 x 1.75 means 12 mm diameter, 1.75 mm between thread (coarse thread).

12 x 1.50 means 12 mm diameter, 1.50 mm between threads (fine thread).

NOTE: There is usually only 1 coarse and 1 fine thread for each customary diameter, however in metric screws you may have 1 coarse thread and perhaps 3 or more fine threads for a diameter.

Gauges are available for metric threads and are used in the same manner as those for customary threads.

METRIC INFORMATION

**ASSEMBLY TORQUE VALUES FOR METRIC HARDWARE
(ALL HARDWARE PLATED OR LUBRICATED)**

**PROPERTY CLASS 4.8
(APPROX. SAE GR. 2)**

DIAMETER & PITCH	ZINC PLATED DRY OR LUB		UNPLATED LUBRICATED	
	IN.-LBS.	*N·m	IN.-LBS.	N·m
M 2.5 x 0.45	2	.23	1.5	.17
	M 3 x 0.5	6	.68	.51
	M 3.5 x 0.6	9	1	.79
	M 4 x 0.7	14	2	1
	M 5 x 0.8	29	3	2
	M 6 x 1	50	6	4
	M 8 x 1.25	120	14	10
	FT.-LBS.	*N·m	FT.-LBS.	N·m
	M 10 x 1.5	20	27	15
	M 12 x 1.75	35	47	26
	M 14 x 2	55	74	41
				56

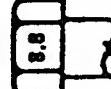
**ASSEMBLY TORQUE VALUES FOR METRIC HARDWARE
(ALL HARDWARE PLATED OR LUBRICATED)**

DIAMETER & PITCH	PROPERTY CLASS 8.8 (APPROX. SAE GR. 5)				PROPERTY CLASS 10.9 (APPROX. SAE GR. 8)			
	ZINC PLATED DRY OR LUB.		UNPLATED LUBRICATED		ZINC PLATED DRY OR LUB.		UNPLATED LUBRICATED	
	FT.-LBS.	*N·m	FT.-LBS.	N·m	FT.-LBS.	N·m	FT.-LBS.	N·m
M 5 x 0.8	4	6	5	7	6	8	7	9
M 6 x 1	7	10	8	11	10	14	12	16
M 8 x 1.25	18	24	20	27	25	33	28	38
M 10 x 1.5	34	47	37	53	49	66	54	74
M 12 x 1.75	60	81	67	91	84	114	94	128
M 14 x 2	95	129	107	145	134	182	150	204
M 16 x 2	146	198	164	222	206	279	231	313
M 20 x 2.5	285	386	320	434	400	543	450	610
M 24 x 3	493	668	553	750	690	935	774	1050
M 30 x 3.5	978	1326	1099	1490	1370	1857	1539	2086
M 36 x 4	1707	2314	1918	2600	2390	3241	2686	3642

*N·m = NEWTON METRES



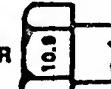
OR



Nut Marking 8 or 9



OR



Nut Marking 10

NOTE: In the diameter and pitch column the bolt designations are:

— M indicates bolt in metric.

— Number following M is the (mm) diameter of the bolt shank.

— The last number is thread pitch which is the distance in (mm) from 1 peak of a thread to the next peak of the adjacent thread.

TORQUE CHART

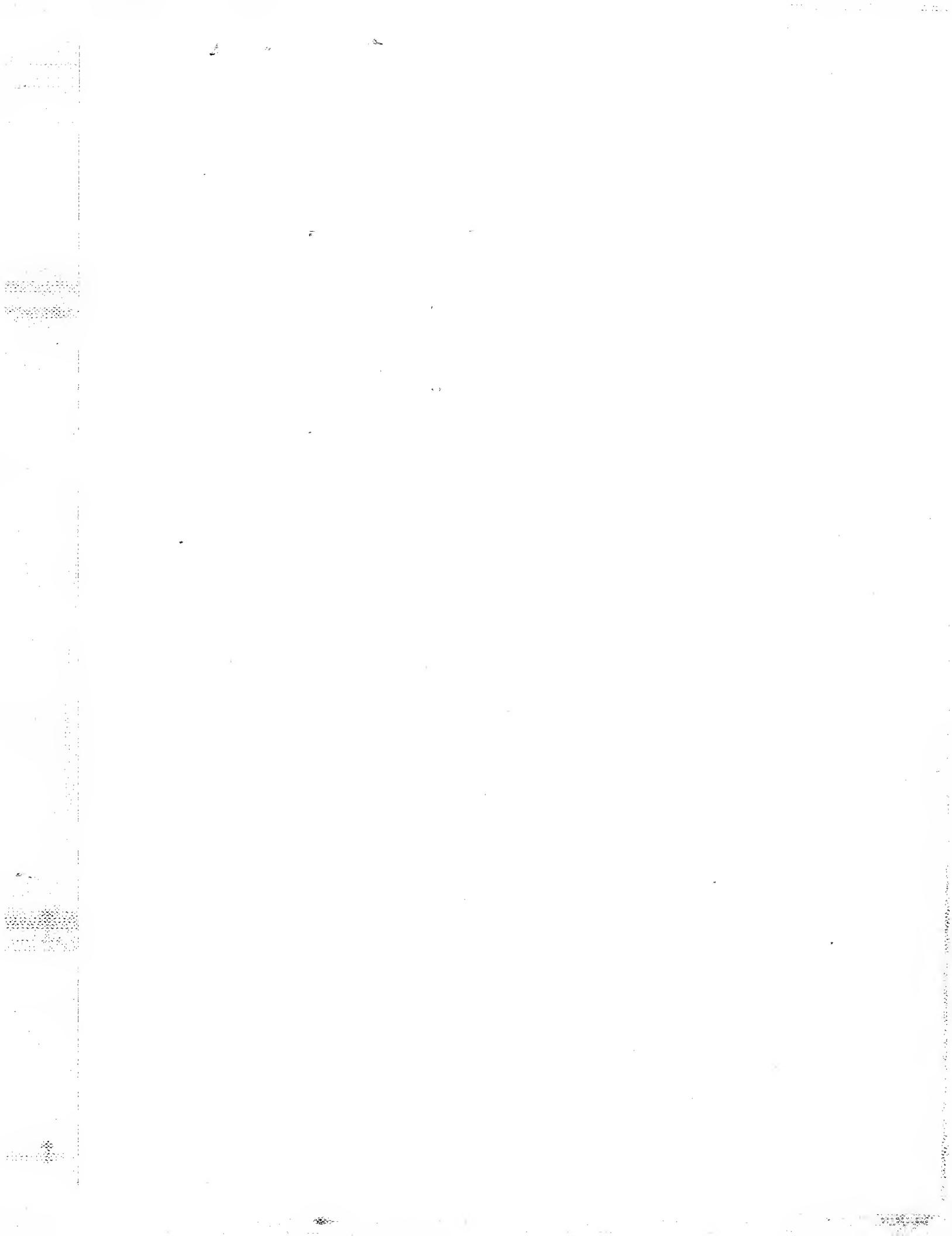
Use the following chart as a guide for proper torque of all bolts during assembly or maintenance work. Use the

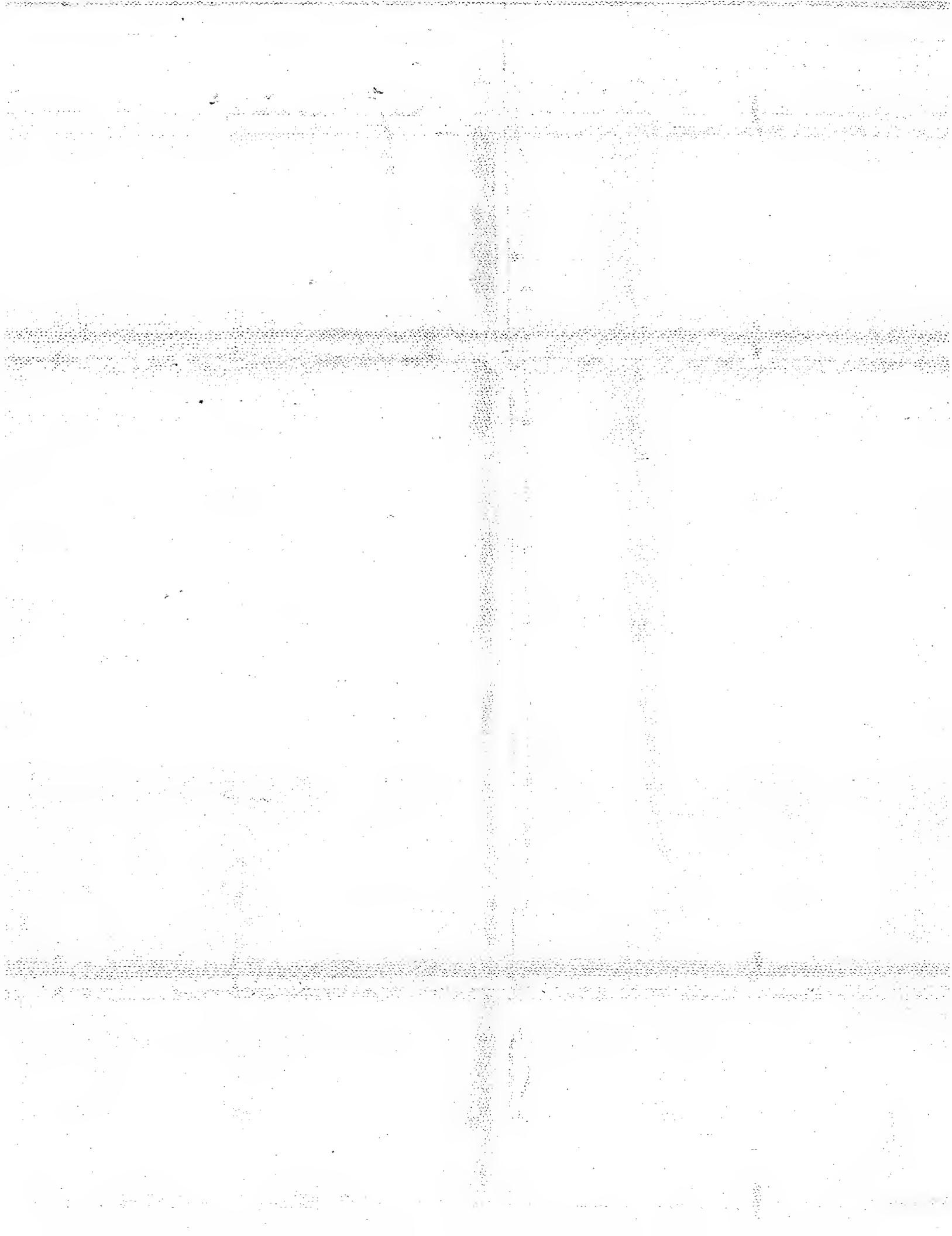
dry column for unplated hardware and the lub column for all plated hardware unless specified otherwise in text.

SUGGESTED ASSEMBLY TORQUE VALUES												
SIZE	SAE GRADE 2 ASSEMBLY TORQUE				SAE GRADE 5 ASSEMBLY TORQUE				GRADE 8 ASSEMBLY TORQUE			
	DRY		LUB		DRY		LUB		DRY		LUB	
	Ft.-Lb.	N·m	Ft.-Lb.	N·m	Ft.-Lb.	N·m	Ft.-Lb.	N·m	Ft.-Lb.	N·m	Ft.-Lb.	N·m
5/16"-18	11	15	8	11	17	23	13	18	25	34	18	24
5/16"-24	12	16	9	12	19	26	14	19	27	37	20	27
3/8"-16	20	27	15	20	30	41	23	31	45	61	35	47
3/8"-24	23	31	17	23	35	47	25	34	50	68	35	47
7/16"-14	30	41	23	31	50	68	35	47	70	95	50	68
7/16"-20	35	47	26	35	55	75	40	54	80	108	60	81
1/2"-13	50	68	35	47	75	102	55	75	110	140	80	108
1/2"-20	55	75	40	54	85	115	65	88	120	163	90	122
9/16"-12	70	95	50	68	110	149	80	108	150	203	110	149
9/16"-18	80	108	60	81	120	163	90	122	170	230	130	176
5/8"-11	95	129	70	95	150	203	110	149	210	285	160	217
5/8"-18	110	149	80	108	170	230	130	176	240	325	180	244
3/4"-10	170	230	125	169	265	359	200	271	375	508	280	380
3/4"-16	190	258	140	190	300	407	225	305	420	569	315	427
7/8"-9	165	224	120	163	430	583	320	434	600	813	450	610
7/8"-14	185	251	135	183	475	644	360	488	670	908	500	678
1"-8	250	339	190	258	645	874	480	651	900	1220	675	915
1"-12	280	380	210	285	720	976	540	732	1000	1356	750	1017
		GRADE 2 NO MARKS			GRADE 5 3 MARKS			GRADE 8 6 MARKS				

The following chart is included for your convenience in converting fractions to decimals or the metric equivalent.

CONVERSION CHART					
FRACTION	DECIMAL	METRIC	FRACTION	DECIMAL	METRIC
1/32"	.031	.79 mm	17/32"	.531	13.49 mm
1/16"	.062	1.59 mm	9/16"	.562	14.29 mm
3/32"	.094	2.38 mm	19/32"	.594	15.08 mm
1/8"	.125	3.17 mm	5/8"	.625	15.87 mm
5/32"	.156	3.97 mm	21/32"	.656	16.77 mm
3/16"	.187	4.76 mm	11/16"	.687	17.46 mm
7/32"	.219	5.56 mm	23/32"	.719	18.26 mm
1/4"	.250	6.35 mm	3/4"	.75	19.05 mm
9/32"	.281	7.14 mm	25/32"	.781	19.84 mm
5/16"	.312	7.94 mm	13/16"	.812	20.64 mm
11/32"	.344	8.73 mm	27/32"	.844	21.43 mm
3/8"	.375	9.53 mm	7/8"	.875	22.23 mm
13/32"	.406	10.32 mm	29/32"	.906	23.02 mm
7/16"	.437	11.11 mm	15/16"	.937	23.81 mm
15/32"	.469	11.91 mm	31/32"	.969	24.61 mm
1/2"	.50	12.7 mm	1"	1.0	25.4 mm





Simplicity Manufacturing, Inc.
500 N. Spring Street
P.O. Box 997
Port Washington, WI 53074-0997